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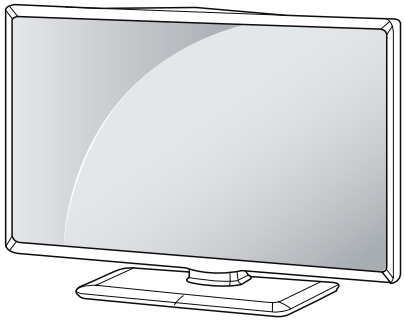
LED TV
SERVICE MANUAL

CHASSIS : LD36M

MODEL : 32LN52** 32LN52**-ZA

CAUTION
BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



P/NO : MFL67729505 (1304-REV00)

Printed in Korea

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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and Exploded View.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.

General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and it's components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1 W), keep the resistor 10 mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

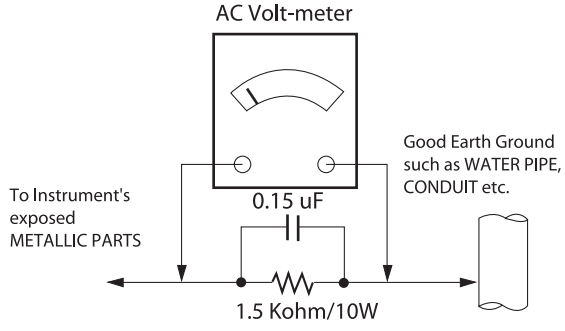
Always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)
With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.
If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1 MΩ and 5.2 MΩ.
When the exposed metal has no return path to the chassis the reading must be infinite.
An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)
Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.
Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.
Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5 mA.
In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit



When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1 Ω
*Base on Adjustment standard

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SERVICING PRECAUTIONS

CAUTION: Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the *SAFETY PRECAUTIONS* on page 3 of this publication.
NOTE: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
   a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
   b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
   c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.
   CAUTION: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.
2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe. Do not test high voltage by "drawing an arc".
3. Do not spray chemicals on or near this receiver or any of its assemblies.
4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10 % (by volume) Acetone and 90 % (by volume) isopropyl alcohol (90 % - 99 % strength)
   CAUTION: This is a flammable mixture.
   Unless specified otherwise in this service manual, lubrication of contacts in not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.
   Always remove the test receiver ground lead last.
8. Use with this receiver only the test fixtures specified in this service manual.
   CAUTION: Do not connect the test fixture ground strap to any heat sink in this receiver.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor “chip” components. The following techniques should be used to help reduce the incidence of component damage caused by static by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as “anti-static” can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
   CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range or 500 °F to 600 °F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25 cm) brush with a metal handle. Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
   a. Allow the soldering iron tip to reach normal temperature. (500 °F to 600 °F)
   b. Heat the component lead until the solder melts.
   c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.
   CAUTION: Work quickly to avoid overheating the circuit board printed foil.
6. Use the following soldering technique.
   a. Allow the soldering iron tip to reach a normal temperature (500 °F to 600 °F)
   b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
   c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
   CAUTION: Work quickly to avoid overheating the circuit board printed foil.
   d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

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IC Remove/Replacement
Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

Removal
1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

Replacement
1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas).

"Small-Signal" Discrete Transistor Removal/Replacement
1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

Power Output, Transistor Device
Removal/Replacement
1. Heat and remove all solder from around the transistor leads.
2. Remove the heat sink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heat sink.

Diode Removal/Replacement
1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular y to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

Fuse and Conventional Resistor
Removal/Replacement
1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.
   CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

Circuit Board Foil Repair
Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board causing the foil to separate from or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

At IC Connections
To repair a defective copper pattern at IC connections use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary).
2. Carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the out-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area and clip off any excess jumper wire.

At Other Connections
Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side. Carefully crimp and solder the connections.
   CAUTION: Be sure the insulated jumper wire is dressed so the it does not touch components or sharp edges.

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SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application range

This specification is applied to the LED TV used LD36M chassis.

2. Requirement for Test

Each part is tested as below without special appointment.

(1) Temperature: 25 °C ± 5 °C(77 °F ± 9 °F), CST: 40 °C ± 5 °C
(2) Relative Humidity: 65 % ± 10 %
(3) Power Voltage
: Standard input voltage (AC 100-240 V~, 50/60 Hz)
* Standard Voltage of each products is marked by models.
(4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
(5) The receiver must be operated for about 5 minutes prior to the adjustment.

3. Test method

(1) Performance: LGE TV test method followed
(2) Demanded other specification
- Safety : CE, IEC specification
- EMC : CE, IEC specification

Model	Market	Appliance
32LN520B-ZA 32LN5203-ZA 42LN5200-ZA 42LN5204-ZA	EU (PAL/DVB Market)	Safety : IEC/EN60065 EMI : EN55013 EMS : EN55020

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4. Model General Specification

No.	Item	Specification	Remarks
1	Market	EU(PAL Market-37Countries)	**DTV & Analog (Total 37 countries)** **DTV (MPEG2/4, DVB-T)** : 37 countries UK/Italy/Germany/France/Spain/Sweden/Finland/Neth-erlands/ Belgium/Luxemburg/ Greece/Denmark/Czech/ Austria /Hungary/Swiss/Croatia/Turkey/Norway/Slovenia/ Poland/Ukraine/Portugal/Ireland/Morocco/Latvia/Estonia/ Lithania/Rumania/Bulgaria/Russia/Slovakia/Bosnia/Serbia/ Albania/Kazakhstan/Belarus **DTV (MPEG2/4, DVB-C)** : 37 countries UK/Italy/Germany/France/Spain/Sweden/Finland/Neth-erlands/Belgium/Luxemburg/ Greece/Denmark/Czech/ Austria/Hungary/Swiss/Croatia/Turkey/Norway/Slovenia/ Poland/Ukraine/Portugal/Ireland/Morocco/Latvia/Estonia/ Lithania/Rumania/Bulgaria/Russia/Slovakia/Bosnia/Serbia/ Albania/Kazakhstan/Belarus
2	Broadcasting system	Analogue TV 1) PAL-BG 2) PAL-DK 3) PAL-I/I' 4) SECAM-BG 5) SECAM-DK 6) SECAM L/L'	Analogue TV : (RF) VHF: E2 to E12, UHF : E21 to E69 (CATV) S1 to S20, HYPER: S21 to S47
		Digital TV 1) DVB-T/C	Digital TV : VHF, UHF
3	Receiving system	Analog : Upper Heterodyne Digital : COFDM , QAM	► DVB-T - Guard Interval (Bitrate_Mbit/s) 1/4, 1/8, 1/16, 1/32 - Modulation : Code Rate QPSK : 1/2, 2/3, 3/4, 5/6, 7/8 16-QAM : 1/2, 2/3, 3/4, 5/6, 7/8 64-QAM : 1/2, 2/3, 3/4, 5/6, 7/8 ► DVB-C - Symbolrate : 4.0Msymbols/s to 7.2Msymbols/s - Modulation : 16QAM, 64-QAM, 128-QAM and 256-QAM
4	Scart Jack (1EA)	PAL, SECAM	Scart 1 Jack is Full scart and support RF-OUT(analog).
5	HDMI Input (2EA)	HDMI1/2-DTV	Support HDCP
6	USB (1EA)	EMF, DivX HD, For SVC (download)	JPEG, MP3, DivX HD
12	DVB	DVB-T	CI : UK, Finland, Denmark, Norway, Sweden, Russia, Spain, Ireland, Luxemburg, Belgium, Netherland CI+ : France(Canal+), Italy(DGTVi)
		DVB-C	CI : Switzerland, Austria, Slovenia, Hungary, Bulgaria CI+ : Switzerland(UPC,Cablecom), Netherland(Ziggo), Germany(KDG,CWB), Finland(labwise)

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5. External Input Support format

5.1. HDMI Input 1 (PC/DTV)

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed		Remark
PC(DVI)					DDC		
1	640*350	31.468	70.09	25.17	EGA	X	
2	720*400	31.469	70.08	28.32	DOS	O	
3	640*480	31.469	59.94	25.17	VESA(VGA)	O	
4	800*600	37.879	60.31	40.00	VESA(SVGA)	O	
5	1024*768	48.363	60.00	65.00	VESA(XGA)	O	
6	1152*864	54.348	60.053	80.00	VESA	O	
7	1360*768	47.712	60.015	85.50	VESA (WXGA)	O	
8	1280*1024	63.981	60.020	108.0	VESA (SXGA)	O	FHD only
9	1920*1080	67.50	60.00	148.5	HDTV 1080P	O	FHD only
DTV							
1	720*480	31.47	59.94	27.00	SDTV 480P		
2	720*480	31.50	60.00	27.027	SDTV 480P		
3	720*576	31.250	50.00	27.00	SDTV 576P		
4	1280*720	37.50	50.00	74.25	HDTV 720P		
5	1280*720	45.00	60.00	74.25	HDTV 720P		
6	1280*720	44.96	59.94	74.176	HDTV 720P		
7	1920*1080	28.125	50.00	74.25	HDTV 1080I		
8	1920*1080	33.75	60.00	74.25	HDTV 1080I		
9	1920*1080	33.72	59.94	74.176	HDTV 1080I		
10	1920*1080	56.250	50.00	148.50	HDTV 1080P		
11	1920*1080	67.50	60.00	148.50	HDTV 1080P		
12	1920*1080	67.432	59.94	148.352	HDTV 1080P		
13	1920*1080	27.00	24.00	74.25	HDTV 1080P		
14	1920*1080	26.97	23.976	74.176	HDTV 1080P		
15	1920*1080	33.75	30.00	74.25	HDTV 1080P		

5.2. USB Input

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1.	1920*1080	33.75	30.000	74.25	HDTV 1080P	

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5.3. USB Input format

Category		Item		Specification	Remark
Photo		JPG, PNG, BMP, TIF, TIFF, GIF		4096X4096	Slide Show support. Background music support
Music		MP3		32kbps ~ 320kbps(Bit rate) 32kHz ~ 48kHz(Sample rate)	
		WMA		128bps ~ 320kbps(Bit rate) 8kHz ~ 48kHz(Sample rate)	
		WAV		1.44kbps(Bit rate) 44.1kHz(Sample rate)	
Category		Codec	Media Container	Profile/Level Support	Remark
Movie	Video	MPEG1/ MPEG2	DAT, MPG, MPEG, DVD, TS, TRP, TP	1920X1080 @ 30I	
		MPEG4 (Divx 3.11, Divx 4.12, Divx 5.x, Divx 6, Divx HD, Xvid 1.00, Xvid 1.01, Xvid 1.02, Xvid 1.03, Xvid 1.10-beta1/2)	AVI, DIVX, MP4, MKV, TS, TRP	1920X1080 @ 30P	
		H.264	AVI, MP4, MKV, TS, TRP, TP	1920X1080 @ 30P	
	Audio	MP3, MP3 Pro	MP3	32kbps ~ 320kbps(Bit rate) 32kHz ~ 48kHz(Sample rate)	
		AC3	AC3	32kbps ~ 640kbps(Bit rate) 32kHz, 44.1kHz, 48kHz(Sample rate)	
		MPEG	MPA	32kbps ~ 448kbps(Bit rate) 32kHz ~ 48kHz(Sample rate)	
		AAC, HEAAC	M4A	24kbps ~ 3844kbps(Bit rate) 8kHz ~ 96kHz(Sample rate)	
		CDDA	CDA	1.44kbps(Bit rate) 44.1kHz(Sample rate)	
		LPCM	AIF, AIFF, WAV	1.41Mbps ~ 9.6Mbps(Bit rate) Multi-channel 44.1kHz, 88.2kHz (Sample rate) 48kHz, 96kHz (Sample rate) Stereo 176.4kHz, 192kHz(Sample rate)	
	ETC	Trick play		a. Pause & Resume b. Fast forward (2x, 4x, 8x, 16x, 32x) c. Fast backward (2x, 4x, 8x, 16x, 32x) d. Forward slow motion (1/2x, 1/4x, 1/8x, 1/16x, 1/32x)	
		Variable video size(Full/Original)		Can support video zoom in/out process when the video is display.	
		Video Preview (Movie Preview function is possible or not. like fast play or thumbnail when user move the cursor in the list)		Can support movie preview. But in preview mode, we don't support any trick mode process.	

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ADJUSTMENT INSTRUCTION

1. Application Range

This specification sheet is applied to all of the LED TV with LD36M chassis.

2. Designation

(1) The adjustment is according to the order which is designated and which must be followed, according to the plan which can be changed only on agreeing.
(2) Power adjustment : Free Voltage.
(3) Magnetic Field Condition: Nil.
(4) Input signal Unit: Product Specification Standard.
(5) Reserve after operation : Above 5 Minutes (Heat Run)
Temperature : at 25 °C ± 5 °C
Relative humidity : 65 ± 10 %
Input voltage : 220 V, 60 Hz
(6) Adjustment equipments: Color Analyzer(CA-210 or CA-110), DDC Adjustment Jig, Service remote control.
(7) Push the "IN STOP" key - For memory initialization.

Case1 : Software version up
1. After downloading S/W by USB , TV set will reboot automatically.
2. Push “In-stop” key.
3. Push “Power on” key.
4. Function inspection
5. After function inspection, Push “In-stop” key.

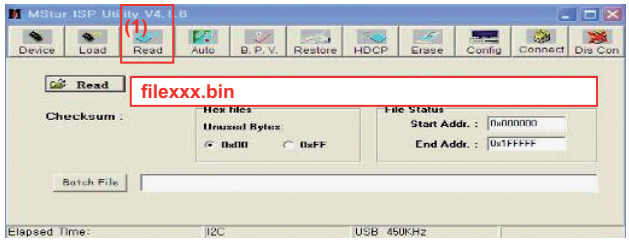
Case2 : Function check at the assembly line
1. When TV set is entering on the assembly line, Push “In-stop” key at first.
2. Push “Power on” key for turning it on.
→ If you push “Power on” key, TV set will recover channel information by itself.
3. After function inspection, Push “In-stop” key.

3. Main PCB check process

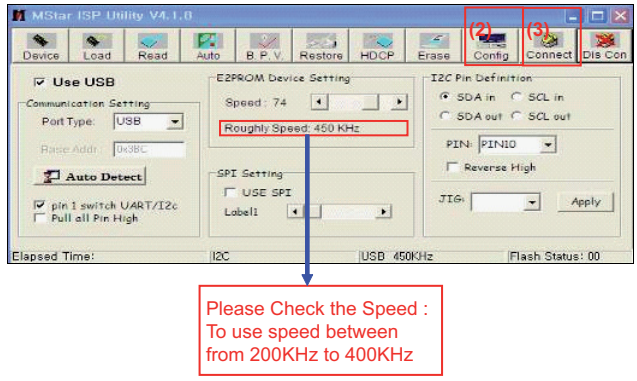
▪ APC - After Manual-Insert, executing APC

* Boot file Download

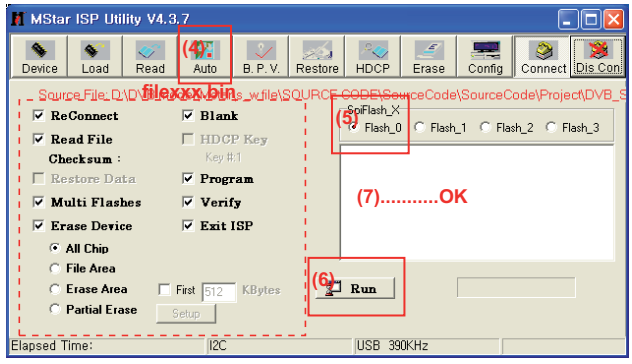
(1) Execute ISP program "Mstar ISP Utility" and then click "Config" tab.
(2) Set as below, and then click "Auto Detect" and check "OK" message.
If "Error" is displayed, check connection between computer, jig, and set.
(3) Click "Read" tab, and then load download file(XXXX.bin) by clicking "Read".



(4) Click "Connect" tab. If "Can't" is displayed, check connection between computer, jig, and set.

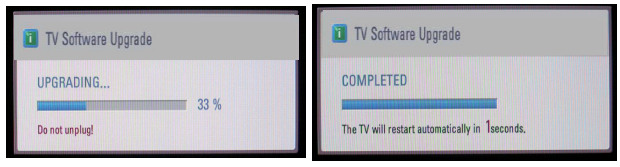


(5) Click "Auto" tab and set as below.
(6) Click "Run".
(7) After downloading, check "OK" message.



* USB DOWNLOAD

(1) Put the USB Stick to the USB socket.
(2) Automatically detecting update file in USB Stick.
- If your downloaded program version in USB Stick is Low, it didn't work. But your downloaded version is High, USB data is automatically detecting.
(3) Show the message "Copying files from memory".
(4) Updating is starting.



(5) Updating Completed, The TV will restart automatically in 5 seconds.
(6) If your TV is turned on, check your updated version and Tool option. (explain the Tool option, next stage)
* If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn’t have a DTV/ATV test on production line.

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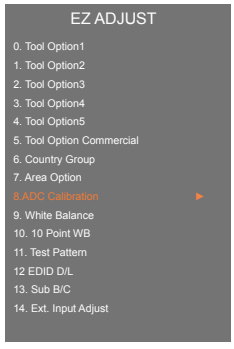
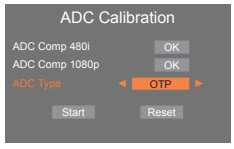
* After downloading, have to adjust Tool Option again.
(1) Push "IN-START" key in service remote control.
(2) Select "Tool Option 1" and push "OK" key.
(3) Punch in the number. (Each model has their number)
(4) Completed selecting Tool option.

3.1. ADC Process

* If ADC processes as OTP, There is no need to proceed internal ADC.

- Enter Service Mode by pushing "ADJ" key,
- Enter Internal ADC mode by pushing "►" key at "7. ADC Calibration".





<Caution> Using "P-ONLY" key of the Adjustment remote control, power on TV.

* ADC Calibration Protocol (RS232)

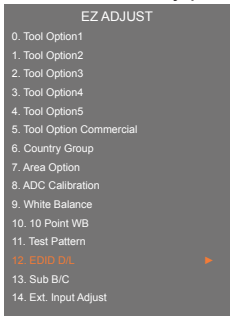
NO	Item	CMD 1	CMD 2	Data 0		
Enter Adjust MODE	Adjust 'Mode In'	A	A	0	0	When transfer the 'Mode In', Carry the command.
ADC adjust	ADC Adjust	A	D	1	0	Automatically adjustment (The use of a internal pattern)

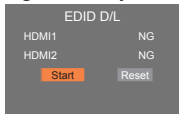
Adjust Sequence
- aa 00 00 [Enter Adjust Mode]
- xb 00 40 [Component Input480i)]
- ad 00 10 [Adjust 480i & 1080p Comp]
- aa 00 90 End Adjust mode

* Required equipment : Adjustment remote control.

3.2. EDID Download

- After enter Service Mode by pushing "ADJ" key.
- Enter EDID D/L menu.
- Enter "START" by pushing "OK" key.





<Caution> Never connect HDMI cable when EDID downloaded.

3.3. EDID data

(1) HD HDMI EDID data(2D Model)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	a		b			
10	c		01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	01	01
30	01	01	01	01	01	01	66	21	50	B0	51	00	1B	30	40	70
40	36	00	40	84	63	00	00	1E	64	19	00	40	41	00	26	30
50	18	88	03	06	40	84	63	00	00	18	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	d			
70	d														01	e
80	02	03	22	F1	4E	10	1F	04	93	05	14	03	02	12	20	21
90	22	15	01	26	15	07	50	09	57	07	f					
A0	80	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	A0	5A
B0	00	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00
C0	20	C2	31	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E
D0	96	00	A0	5A	00	00	00	18	02	3A	80	18	71	38	2D	40
E0	58	2C	45	00	A0	5A	00	00	00	1E	00	00	00	00	00	00
F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	e

(2) FHD HDMI EDID data(2D Model)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	a		b			
10	c		01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	d			
70	d														01	e
80	02	03	22	F1	4E	10	9F	04	13	05	14	03	02	12	20	21
90	22	15	01	26	15	07	50	09	57	07	f					
A0	f		01	1D	80	18	71	1C	16	20	58	2C	25	00	20	C2
B0	31	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00
C0	20	C2	31	00	00	1E	02	3A	80	18	71	38	2D	40	58	2C
D0	45	00	A0	5A	00	00	00	1E	01	1D	00	BC	52	D0	1E	20
E0	B8	28	55	40	C4	8E	21	00	00	1E	00	00	00	00	00	00
F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	e

(3) Detail EDID Options are below

a. Product ID

MODEL NAME	HEX	EDID Table	DDC Function
HD/FHD Model	0001	01 00	Analog/Digital

b. Serial No: Controlled on production line.

c. Month, Year: Controlled on production line:
ex) Week : '01' -> '01'
Year : '2013' -> '17' fix

d. Model Name(Hex):
cf) TV set's model name in EDID data is below.

Model name	MODEL NAME(HEX)
LG TV	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20 20 (LG TV)

e. Checksum: Changeable by total EDID data.

EDID C/S data		HD
		HDMI
Check sum (Hex)	Block 0	A3
	Block 1	5B (HDMI1)
		4B (HDMI2)

f. Vendor Specific(HDMI)

Input	Model name(HEX)
HDMI1	67030C001000801E
HDMI2	67030C002000801E

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3.4. Function Check

- Check display and sound
  - ■ Check Input and Signal items.
    1) TV
    2) AV (SCART / CVBS)
    3) HDMI
    * Display and Sound check is executed by Remote control.

    <Caution>
    Not to push the INSTOP key after completion if the function inspection.

4. Total Assembly line process

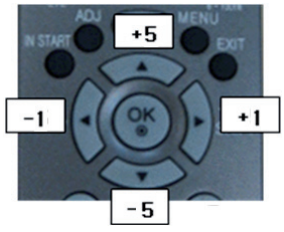
4.1.V-com adjustment

■ Insert V-com adjust pattern

(1) Push 'Power Only' key on SVC remote controller.
(2) Push 'Yellow' key.
(4) Push number '0' key.
- Default : 160

■ V-com adjust (Variable range : ±5)
- 5 digit move → push navigation key up or down.
- 1 digit move → push navigation key left or right.

Keep move V-com adjust until disappear flicker.
After V-com adjust push 'enter' (save) key.



■ Exit V-COM adjust pattern
- Push 'Power Only' key on SVC remote control.

4.2. White Balance adjustment

▪ W/B Equipment condition
CA210 : LED -> CH14, Test signal: Inner pattern(80IRE)
▪ Above 5 minutes H/run in the inner pattern. ("power on" key of adjust remote control)

Mode	Temp	Coordinate spec
Cool	13,000 K	X=0.271 (±0.002) Y=0.270 (±0.002)
Medium	9,300 K	X=0.285 (±0.002) Y=0.293 (±0.002)
Warm	6,500 K	X=0.313 (±0.002) Y=0.329 (±0.002)

▪ Normal line(LGD/CMI, March ~ December for Gumi, Global)

NetCase4	Aging time (Min)	Cool		Medium		Warm	
		X	y	x	y	x	y
		271	270	285	293	313	329
1	0-2	281	287	295	310	320	342
2	3-5	280	285	294	308	319	340
3	6-9	278	284	292	307	317	339
4	10-19	276	281	290	304	315	336
5	20-35	275	277	289	300	314	332
6	36-49	274	274	288	297	313	329
7	50-79	273	272	287	295	312	327
8	80-119	272	271	286	294	311	326
9	Over 120	271	270	285	293	310	325

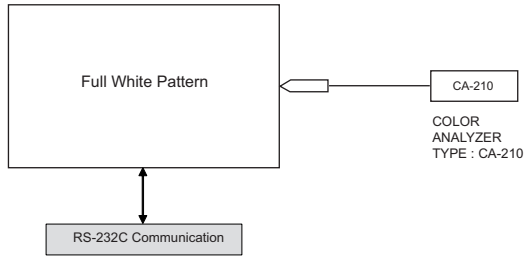
▪ Normal line(LGD/CMI, January ~ February for Gumi, Apply not Cinema Screen)

NetCase4	Aging time (Min)	Cool		Medium		Warm	
		X	y	x	y	x	y
		271	270	285	293	313	329
1	0-2	283	292	297	315	322	347
2	3-5	282	290	296	313	321	345
3	6-9	280	288	294	311	319	343
4	10-19	277	284	291	307	316	339
5	20-35	275	279	289	302	314	334
6	36-49	274	275	288	298	313	330
7	50-79	273	272	287	295	312	327
8	80-119	272	271	286	294	311	326
9	Over 120	271	270	285	293	310	325

* Aging chamber(LGD/CMI)

NetCase4	Aging time (Min)	Cool		Medium		Warm	
		X	y	x	y	x	y
		271	270	285	293	313	329
1	0-2	280	285	294	308	319	340
2	3-5	276	280	290	303	315	335
3	6-9	272	275	286	298	311	330
4	10-19	269	272	283	295	308	327
5	20-35	267	268	281	291	306	323
6	36-49	266	265	280	288	305	320
7	50-79	265	263	279	286	304	318
8	80-119	264	261	278	284	303	316
9	Over 120	264	260	278	283	303	315

* Connecting picture of the measuring instrument
(On Automatic control)
Inside PATTERN is used when W/B is controlled. Connect to auto controller or push Adjustment R/C P-ONLY → Enter the mode of White-Balance, the pattern will come out.



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*** Auto-control interface and directions**

(1) Adjust in the place where the influx of light like floodlight around is blocked. (illumination is less than 10 lux).

(2) Adhere closely the Color analyzer(CA210) to the module less than 10 cm distance, keep it with the surface of the Module and Color analyzer's prove vertically.(80° ~ 100°).

(3) Aging time

- After aging start, keep the power on (no suspension of power supply) and heat-run over 5 minutes.
- Using 'no signal' or 'POWER ONLY' or the others, check the back light on.

▪ Auto adjustment Map(using RS-232C to USB cable)

RS-232C COMMAND

[CMD ID DATA]

Wb 00 00 White Balance Start

Wb 00 ff White Balance End

	RS-232C COMMAND [CMD ID DATA]			MIN	CENTER (DEFAULT)			MAX
	Cool	Mid	Warm		Cool	Mid	Warm	
R Gain	jg	Ja	jd	00	172	192	192	254
G Gain	jh	Jb	je	00	172	192	192	192
B Gain	ji	Jc	jf	00	192	192	172	254
R Cut					64	64	64	128
G Cut					64	64	64	128
B Cut					64	64	64	128

<Caution>

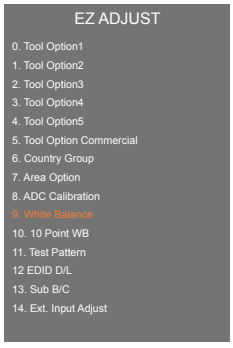
Color Temperature : COOL, Medium, Warm.

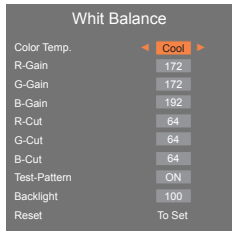
One of R Gain/G Gain/ B Gain should be kept on 0xC0, and adjust other two lower than C0.(When R/G/B Gain are all C0, it is the FULL Dynamic Range of Module)

*** Manual W/B process using adjust Remote control.**

▪ After enter Service Mode by pushing "ADJ" key,

▪ Enter White Balance by pushing "▶" key at "9. White Balance".





* CASE Cool Mode

First adjust the coordinate far away from the target value(x, y).B.

1) x, y > target
2) x, y < target
3) x >target, y < target
4) x < target, y > target
   - Every 4 case have to fit y value by adjusting B Gain and then fit x value by adjusting R-Gain.
   - In this case, increasing/decreasing of B Gain and R Gain can be adjusted.

How to adjust

1) In case G gain more than 172
   Adjust R Gain and B Gain less than 192
2) if the G gain value be adjusted down to 172
   One of the R/B Gain is 254
3) if G Gain is 172, More than one of R/B Gain is to be between 192~254.

* CASE Medium / Warm

First adjust the coordinate far away from the target value(x, y).

1) x, y > target
   i) Decrease the R, G.
2) x, y < target
   i) First decrease the B gain,
   ii) Decrease the one of the others.
3) x > target, y < target
   i) First decrease B, so make y a little more than the target.
   ii) Adjust x value by decreasing the R
4) x < target, y > target
   i) First decrease B, so make x a little more than the target.
   ii) Adjust x value by decreasing the G

* After you finished all adjustments, Press "In-start" key and compare Tool option and Area option value with its BOM, if it is correctly same then unplug the AC cable. If it is not same, then correct it same with BOM and unplug AC cable. For correct it to the model's module from factory Jig model.

* Push the "IN STOP" key after completing the function inspection. And Mechanical Power Switch must be set “ON”.

4.3. Outgoing condition Configuration

■ When pressing IN-STOP key by SVC remocon, Red LED are blinked alternatively. And then automatically turn off. (Must not AC power OFF during blinking)

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5. HI-POT Test

5.1. HI-POT auto-check preparation

- Check the POWER cable and SIGNAL cable insertion condition

5.2. HI-POT auto-check

(1) Pallet moves in the station. (POWER CORD / AV CORD is tightly inserted)
(2) Connect the AV JACK Tester.
(3) Controller (GWS103-4) on.
(4) HI-POT test (Auto)
- If Test is failed, Buzzer operates.
- If Test is passed, GOOD Lamp on and move to next process automatically.

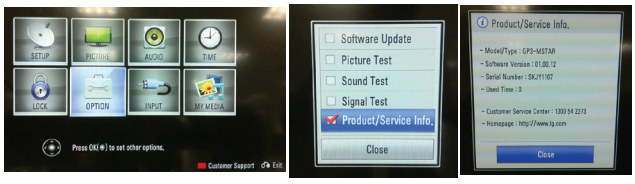
5.3. Checkpoint

(1) Test voltage
- Touchable Metal : 3 KV / min at 100 mA
- SIGNAL : 3 KV / min at 100 mA

(2) TEST time: 1 second. (case : mass production)
(3) TEST POINT
- Touchable Metal => LIVE & NEUTRAL : Touchable Metal.
- SIGNAL => LIVE & NEUTRAL : SIGNAL.

6. Model name & Serial number D/L

▪ Press "Power on" key of service remote control.
(Baud rate : 115200 bps)
▪ Connect RS232 Signal Cable to RS-232 Jack.
▪ Write Serial number
▪ Must check the serial number at the Diagnostics of SET UP menu.
(Refer to below).



6.1. Signal Table

CMD	LENGTH	ADH	ADL	DATA_1	. . .	Data_n	CS	DELAY

CMD : A0h
LENGTH : 85~94h (1~16 bytes)
ADH : EEPROM Sub Address high (00~1F)
ADL : EEPROM Sub Address low (00~FF)
Data : Write data
CS : CMD + LENGTH + ADH + ADL + Data_1 +...+ Data_n
Delay : 20ms

6.2. Command Set

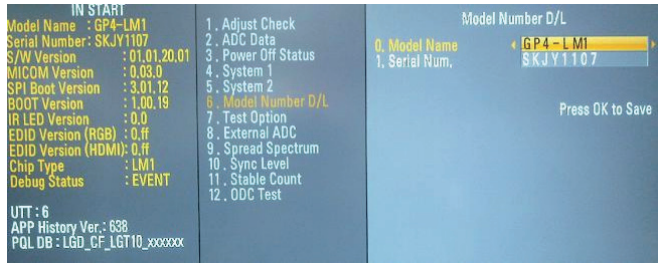
Adjust mode	CMD(hex)	LENGTH(hex)	Description
EEPROM WRITE	A0h	84h+n	n-bytes Write (n = 1~16)

* Description
FOS Default write : <7mode data> write
Vtotal, V_Frequency, Sync_Polarity, Htotal, Hstart, Vstart, 0, Phase
Data write : Model Name and Serial Number write in EEPROM,.

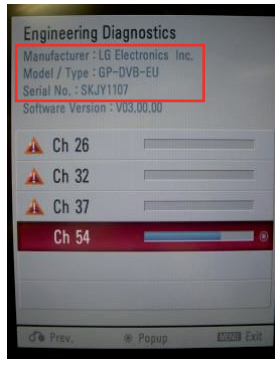
6.3. Method & notice

(1) Serial number D/L is using of scan equipment.
(2) Setting of scan equipment operated by Manufacturing Technology Group.
(3) Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0.

* Manual Download(Model Name and Serial Number)
If the TV set is downloaded by OTA or Service man, sometimes model name or serial number is initialized.(Not always)
There is impossible to download by bar code scan, so It need Manual download.
1) Press the "Instart" key of Adjustment remote control.
2) Go to the menu "6.Model Number D/L" like below photo.
3) Input the Factory model name(ex 32LN520B-ZA) or Serial number like photo.



4) Check the model name Instart menu → Factory name displayed (ex 32LN520B-ZA)
5) Check the Diagnostics (DTV country only) → Buyer model displayed (ex 32LN520B-ZA)



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7. MAC Address & CI+ key download

7.1 MAC Address

7.1.1 Equipment & Condition

- Play file : Serial.exe
- MAC Address edit
- Input Start / End MAC address

7.1.2 Download method

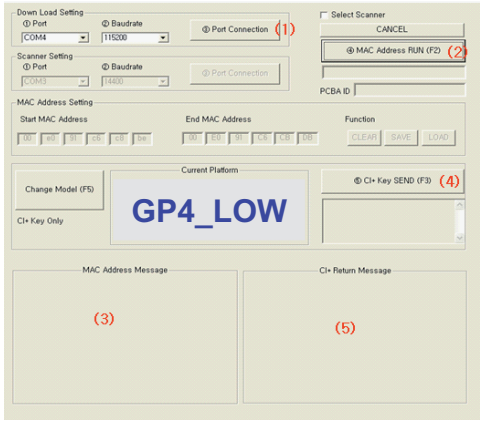
(1) Communication Prot connection

Connection : PCBA (USB Port) → USB to Serial Adapter (UC-232A) → RS-232C cable → PC(RS-232C port)

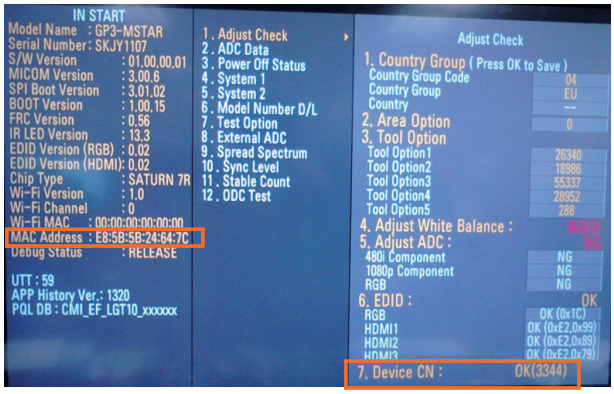
* Caution : LJ21* chassis support only UC-232A driver. (only use this one.)

(2) MAC Address(Not use) & CI+ Key Download

- Set CI+ Key path Directory at Start Mac & CI+ Download Programme
- Com 1,2,3,4 and 115200(Baudrate)



- Port connection button click(1)
- Push the (2) MAC Address write.
- At success Download, check the OK (3)
- Start CI+ Key Download, Push the (4)
- Check the OK or NG



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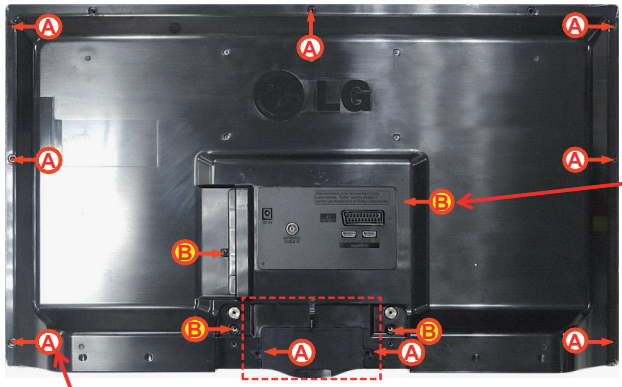
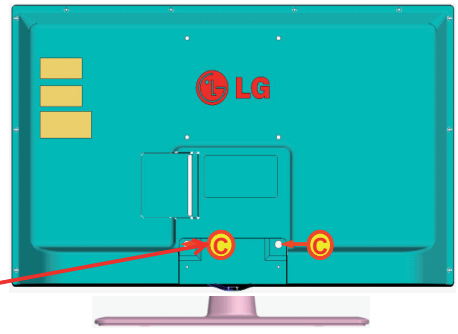
SCREW ASSEMBLY WORKING GUIDE

■ Screw specification and application situation



• FAB31339403
(M3*L6, BK, Machine)
• 4EA

• FAB31639801
(M4*L10, BK, Taptite)
• 9EA



• FAB30016124
(M4*L14, BK, Machine)
• 2EA

<Warning>
Check Screw Type When Screw is assembled at 'A' Part. If 'B' Screw is used at the 'A' part, Module will get damaged.

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DISASSEMBLY WORKING GUIDE

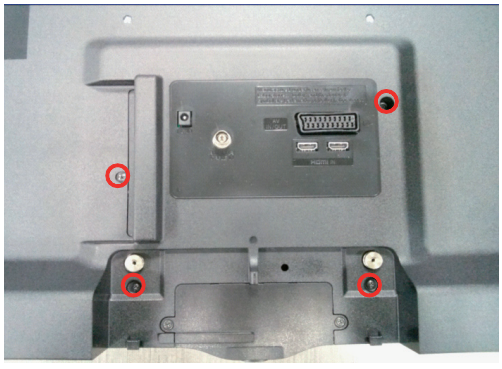
1

Disassemble 2 screws that bind Stand Ass'y and set

2

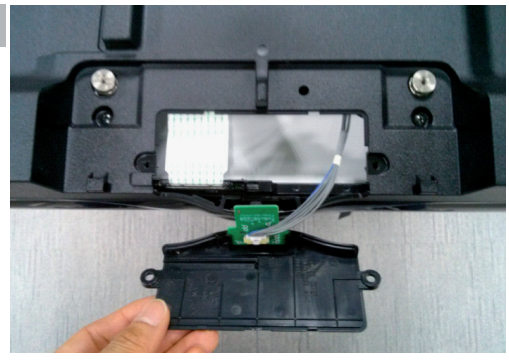
Disassemble 7 screws around the 4 edges of set after Separation Stand Ass'y

3



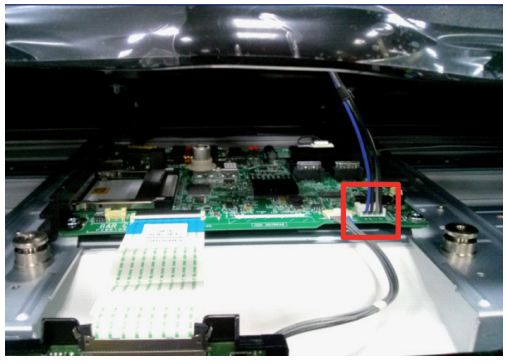
Disassemble 4 screws that fix Side AV bracket and Back-cover.

4



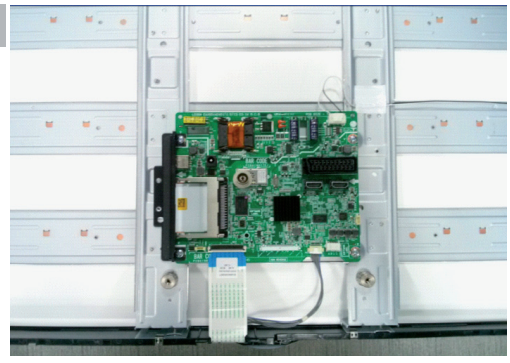
After opening cover of IR Ass'y Disconnect IR cable

5



After lifting up back-cover slightly, Disconnect SPK cable

6



Remove the back-cover and Disconnect LVDS and Power cable from Main PCB

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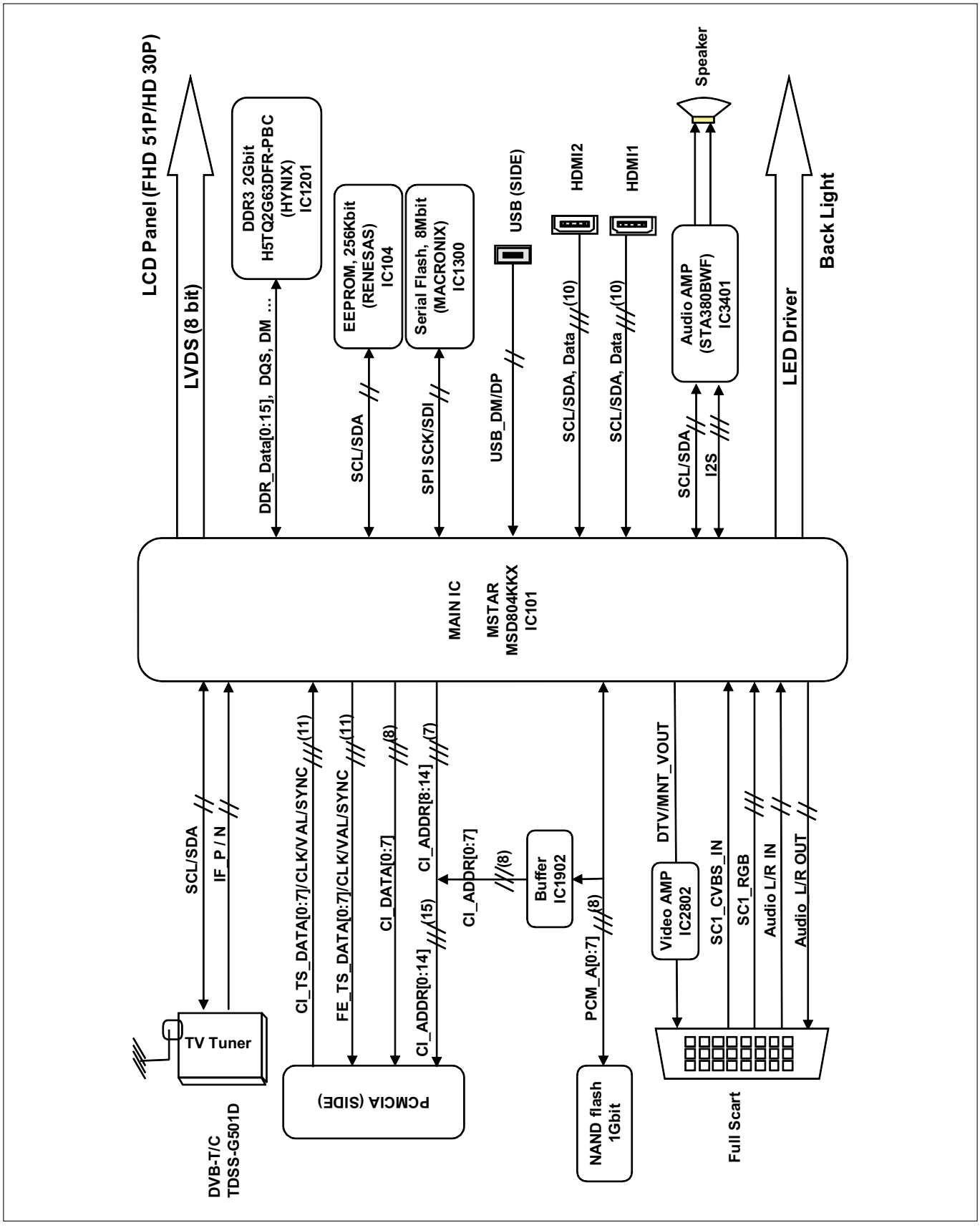
BLOCK DIAGRAM

1. MAIN



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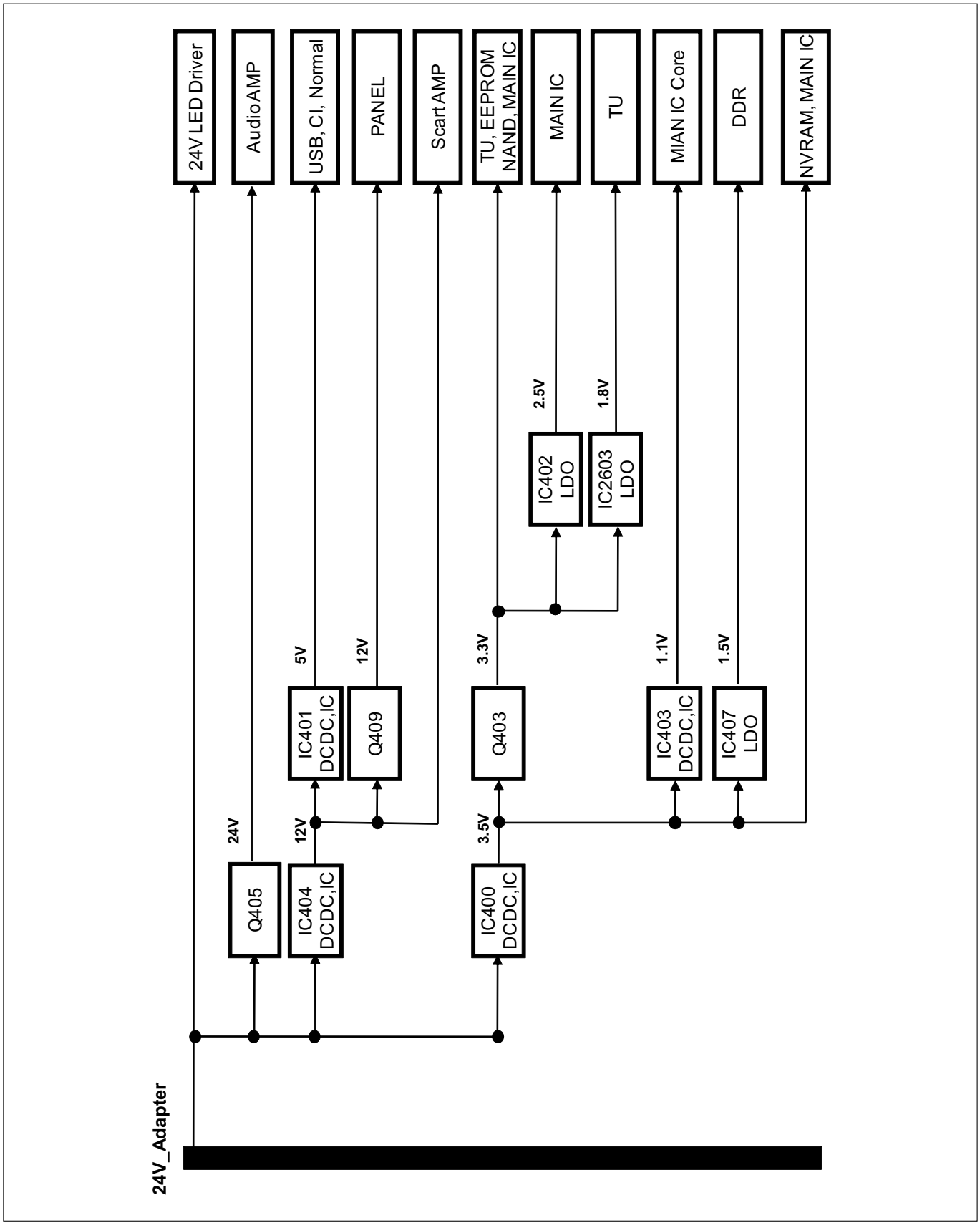
2. POWER



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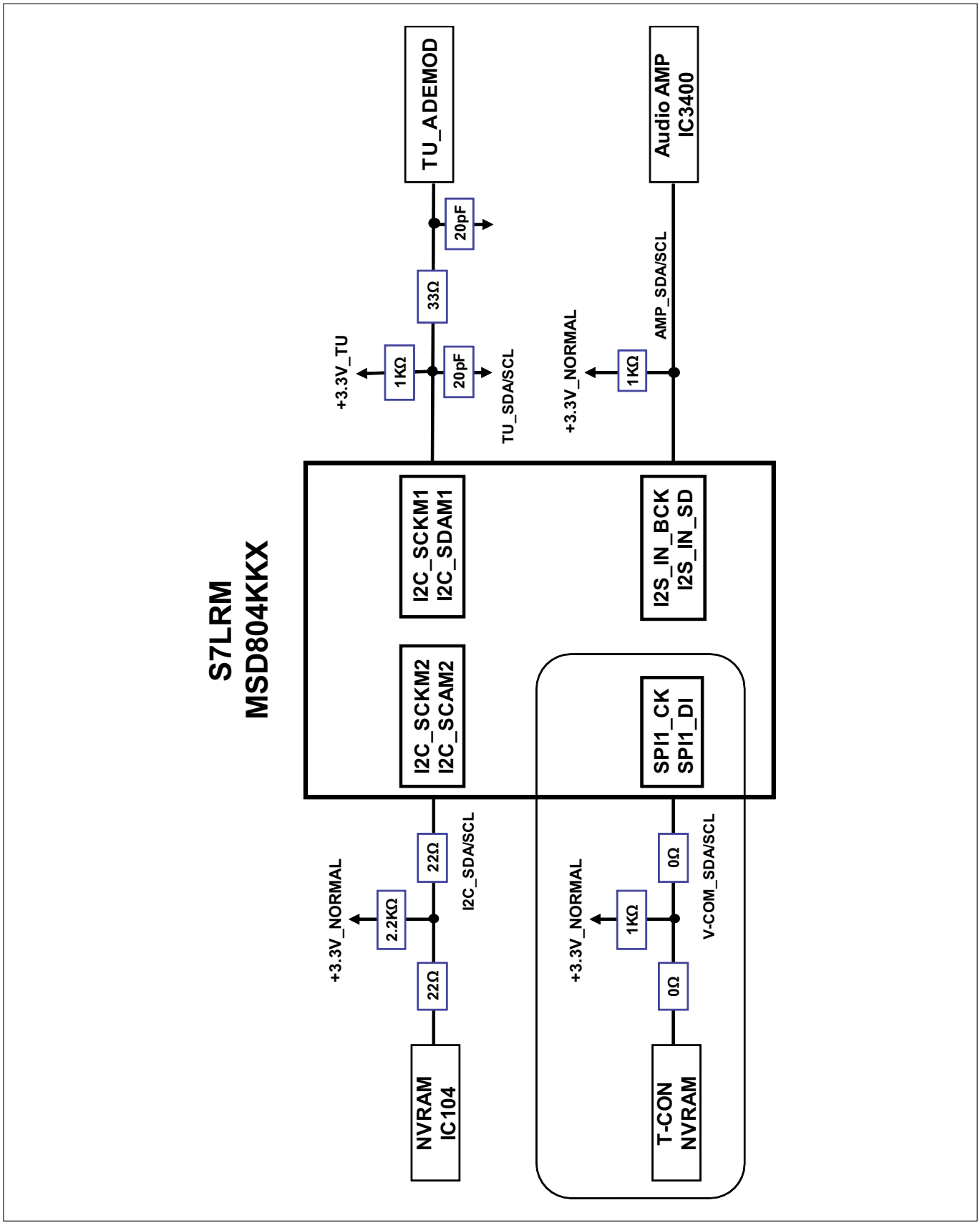
3. I2C



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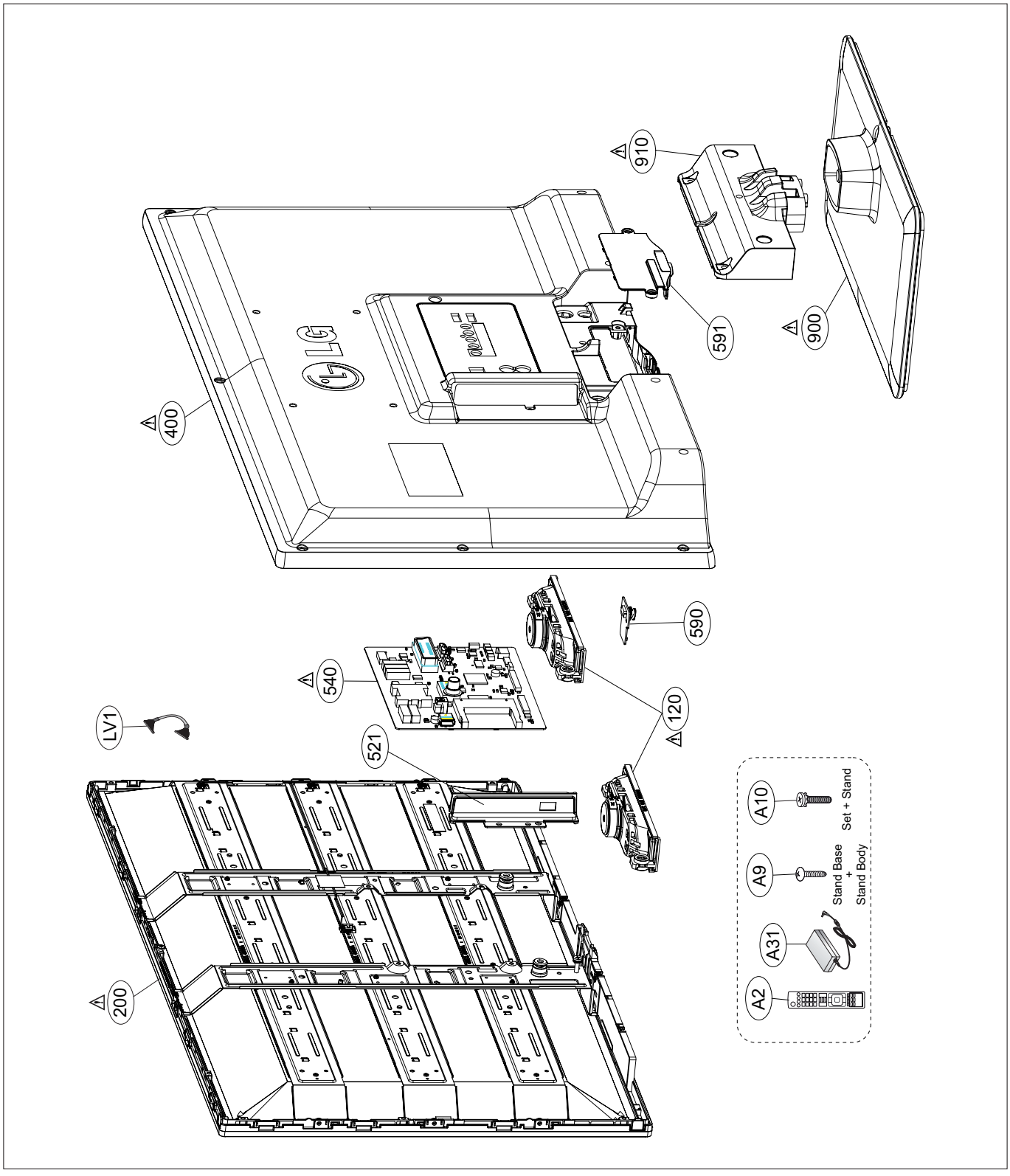
EXPLODED VIEW

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and EXPLODED VIEW.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.



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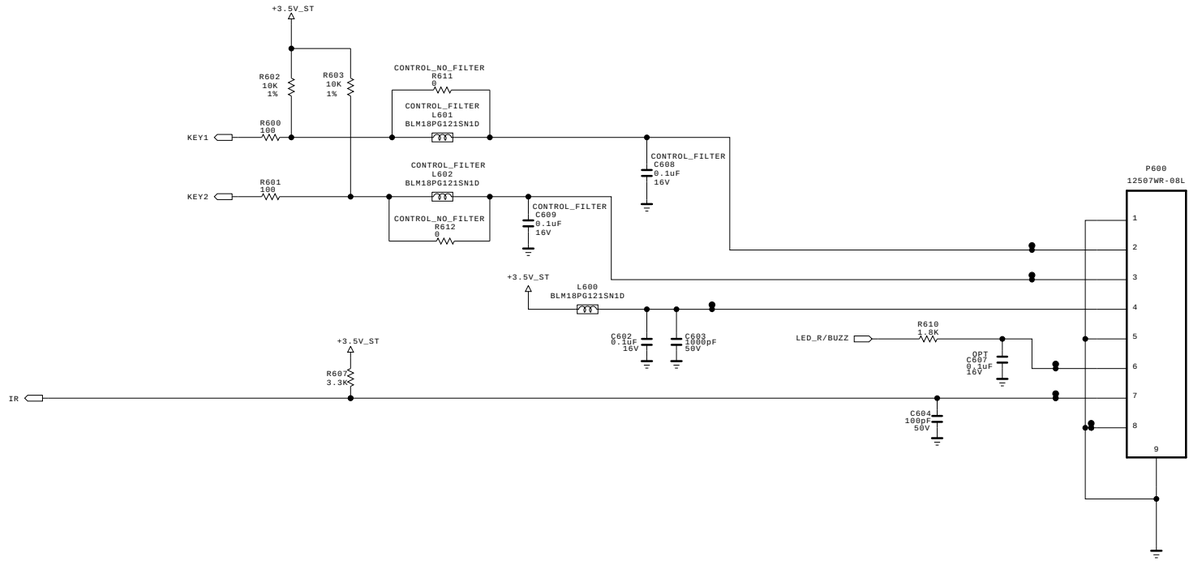
IR/LED and Control



THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

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MODEL	NC4_S7LRM	DATE	2012/07/18
BLOCK	IR/CONTROL	SHEET	6 /

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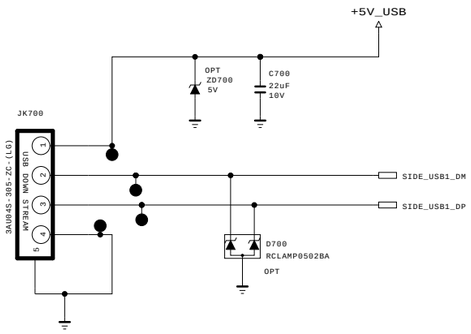
USB (SIDE)



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MODEL	NC4_S7LRM	DATE	13/03/27
BLOCK	USB	SHEET	7 /

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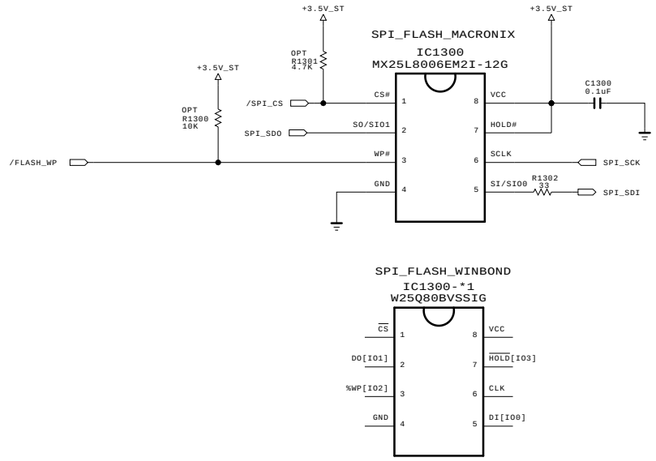
Serial Flash for SPI boot(OS)



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MODEL	NC4_S7LRM	DATE	2012/06/20
BLOCK	S_FLASH_OS	SHEET	13

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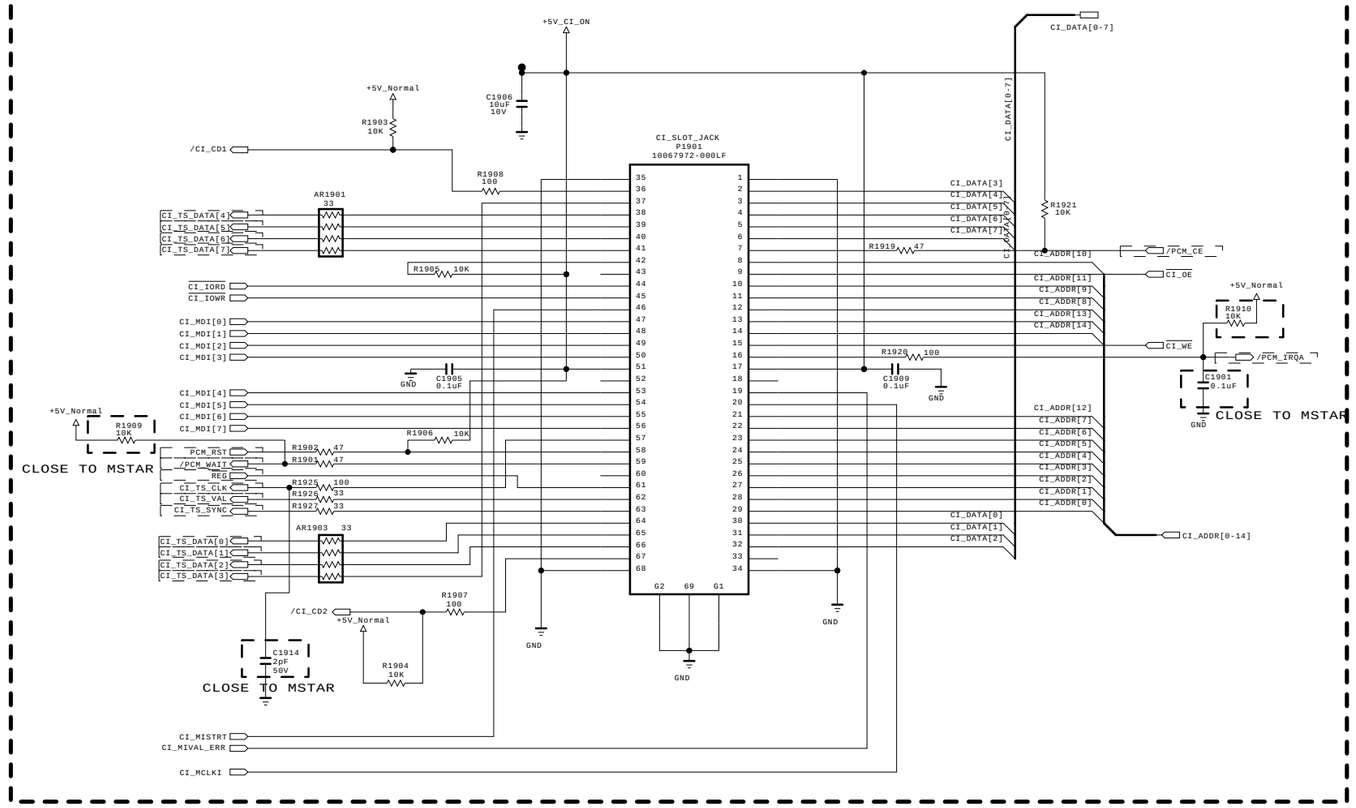
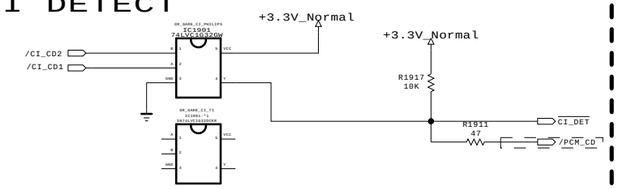
CI Region

* Option name of this page : CI_SLOT
(because of Hong Kong)

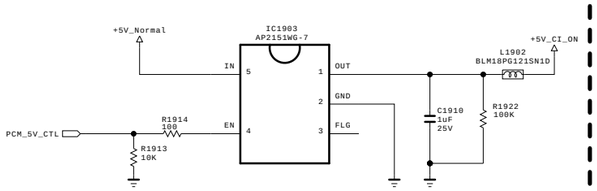
CI SLOT



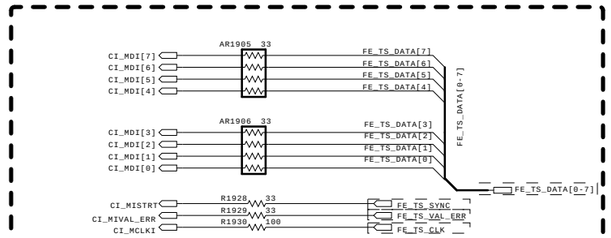
CI DETECT



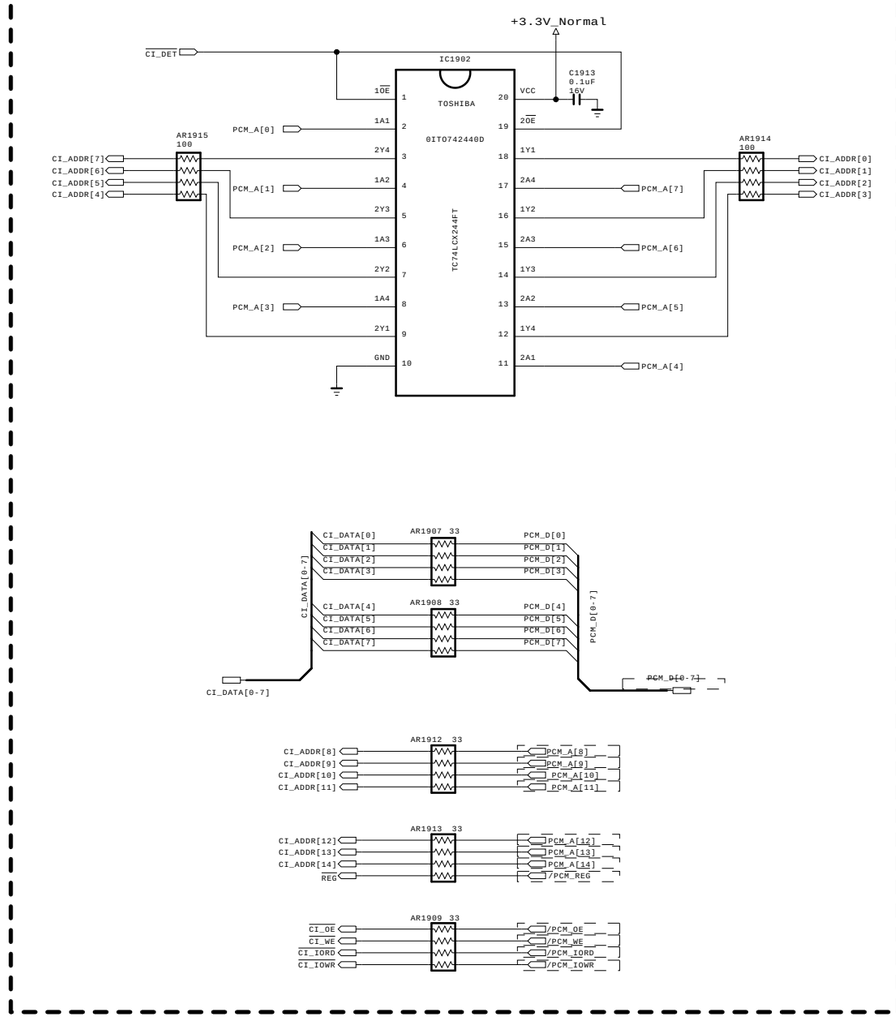
CI POWER ENABLE CONTROL



CI TS INPUT



CI HOST I/F



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MODEL	NC4_S7LRM	DATE	2013/03/25
BLOCK	PCMCI	SHEET	19 /

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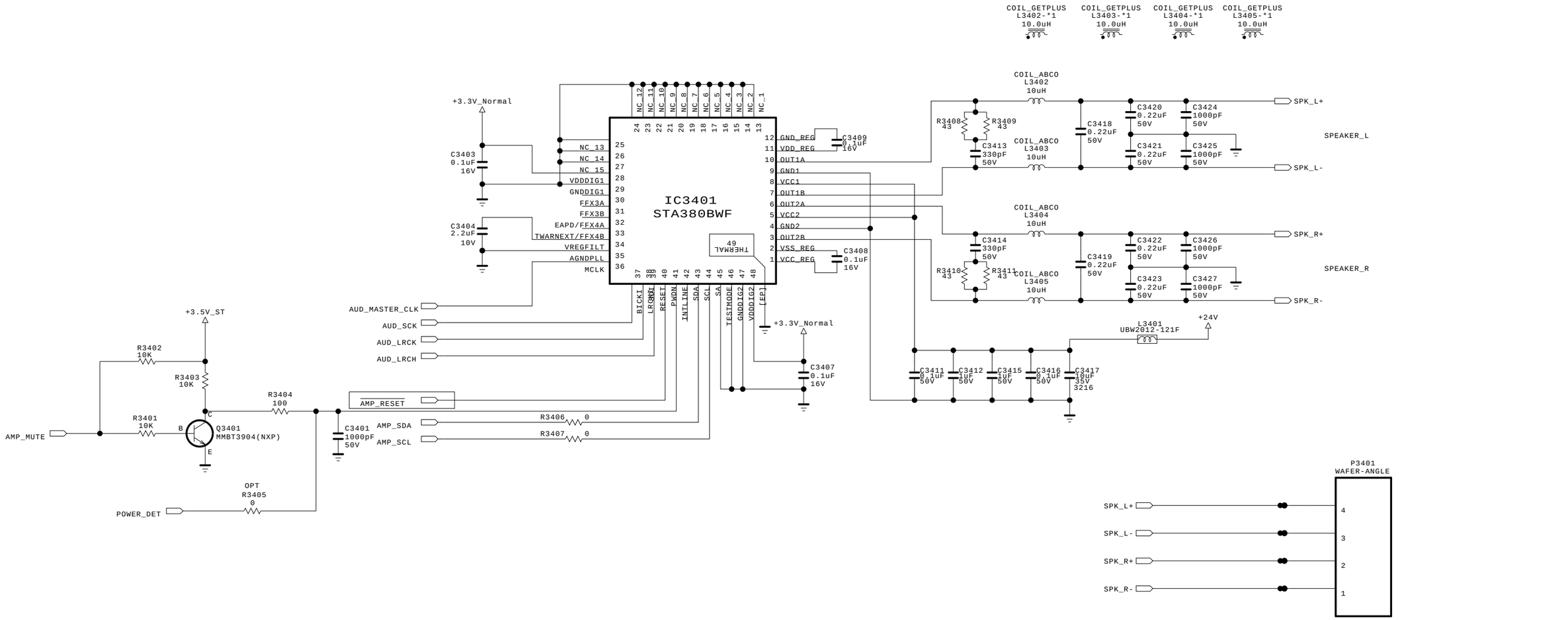
AUDIO AMP(STA380BWEF)



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MODEL	NC4_S7LRM	DATE	2013/02/05
BLOCK	AMP_STA380BWEF	SHEET	34

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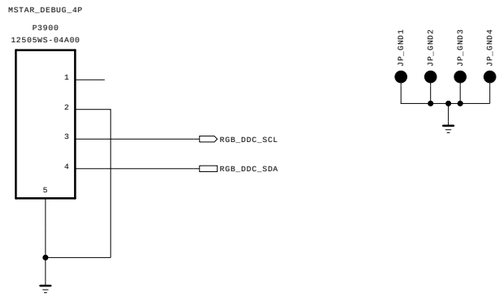
MSTART DEBUG_4PIN



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MODEL	NC4_S7LRM	DATE	2012/06/20
BLOCK	MSTAR DEBUG_4PIN	SHEET	39 /

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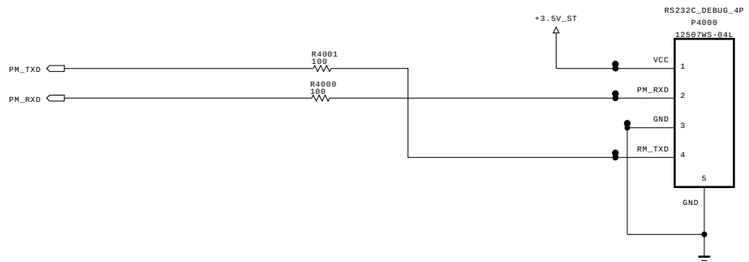
RS-232C



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MODEL	NC4_S7LRM	DATE	2012/06/20
BLOCK	RS232C_4P_OS	SHEET	40

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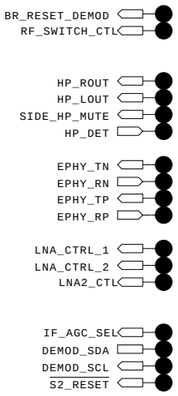
EU NOT USED TP (ERRC)



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MODEL	NC4_S7LRM	DATE	2012/07/04
BLOCK	EU_TP(ERRC)	SHEET	41 /

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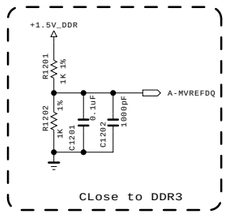
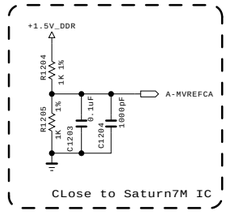
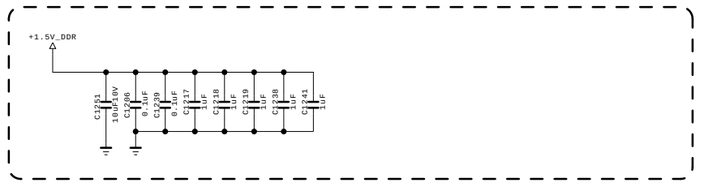
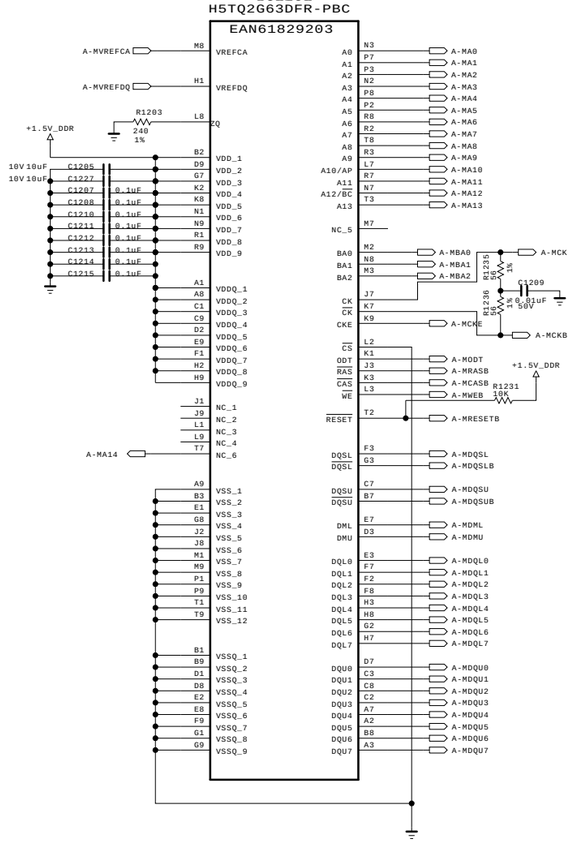




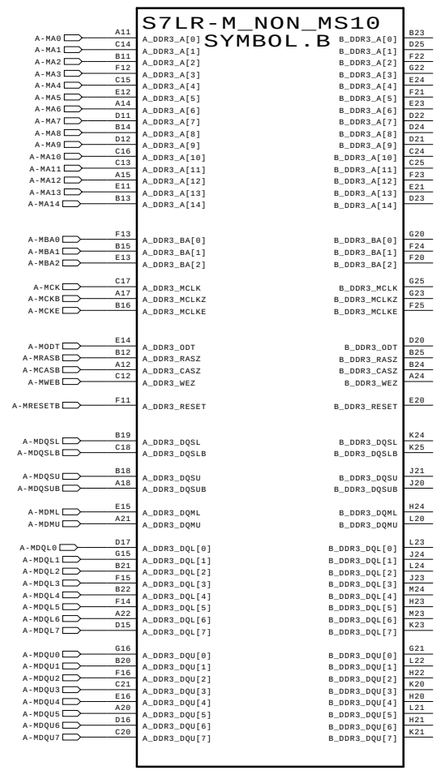


DDR_1600_2G_HYNIX

IC1201
H5TQ2G63DFR-PBC
EAN61829203



IC101
MSD804KKX

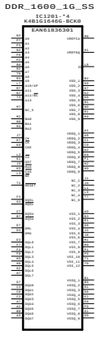


DDR_1600_2G_SS

DDR_1600_2G_NANYA

DDR_1600_1G_HYNIX

DDR_1600_1G_SS



DDR_1600_1G_NANYA

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MODEL	NC4_S7LRM	DATE	2012/06/21
BLOCK	M1_DDR (1DDR)	SHEET	54

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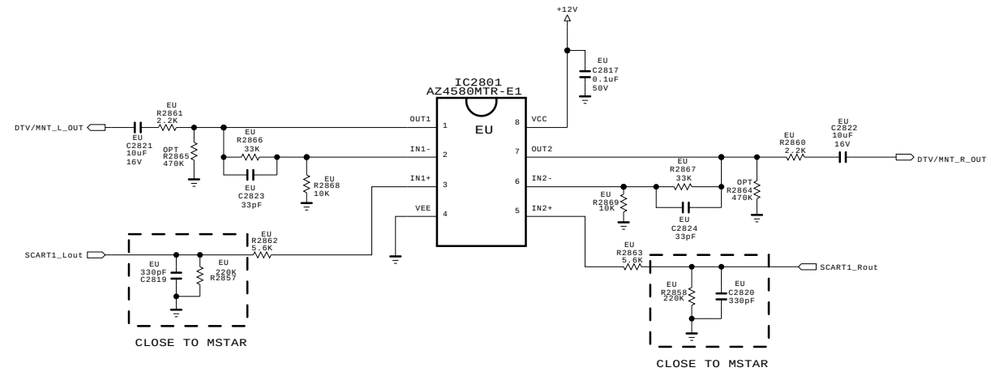
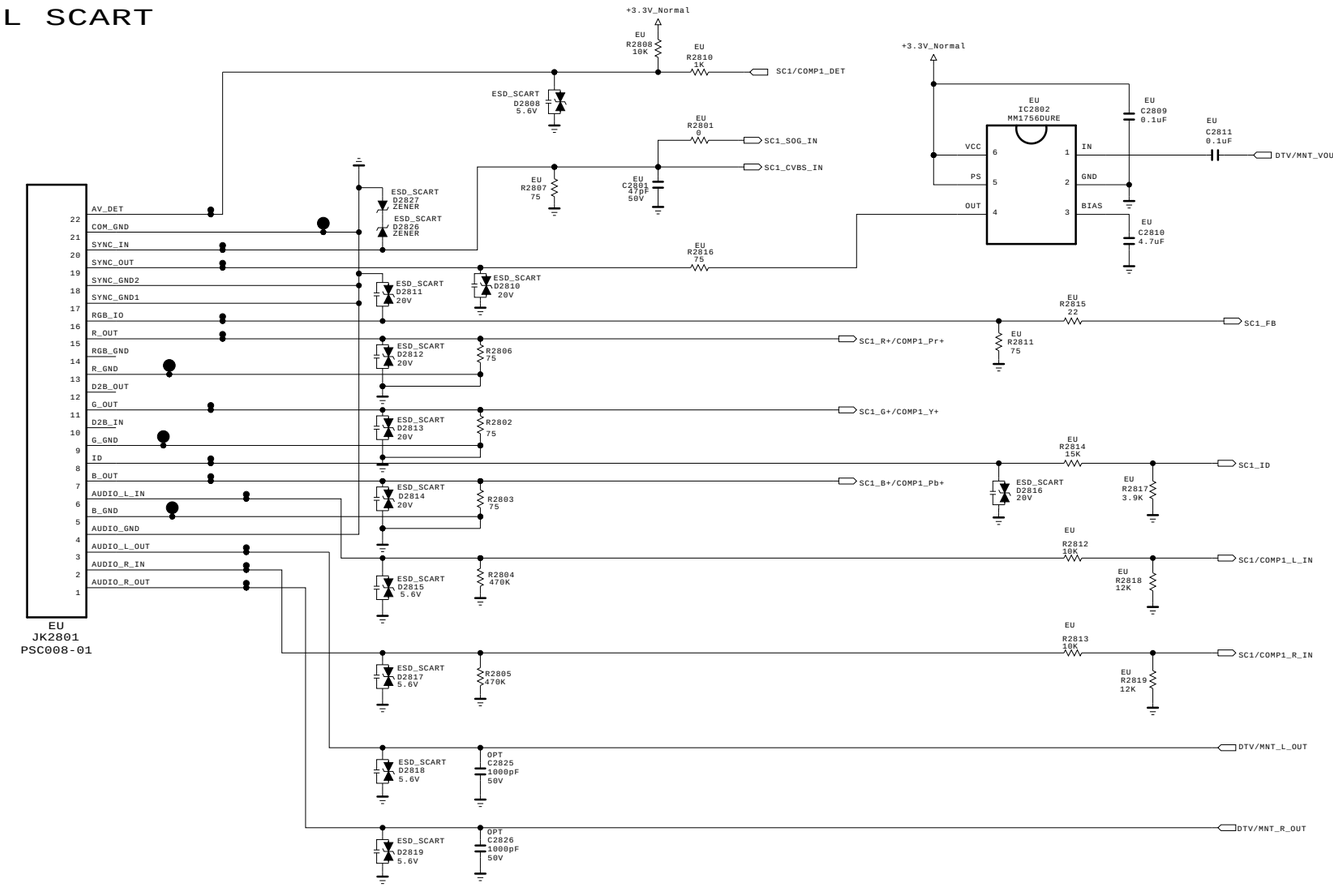
FULL SCART

COMPONENT & AV NOT USE TP(LN52)

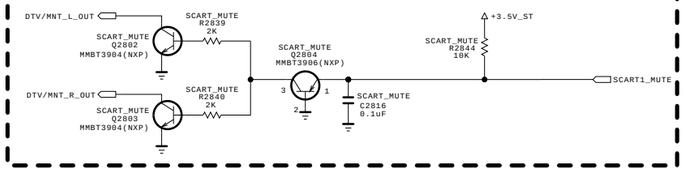
SCART AMP



FULL SCART



[SCART AUDIO MUTE]



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LG ELECTRONICS

MODEL	NC4_S7LRM	DATE	2013/03/07
BLOCK	REAR_JACK_EU_OS_ERRC_LN52	SHEET	66

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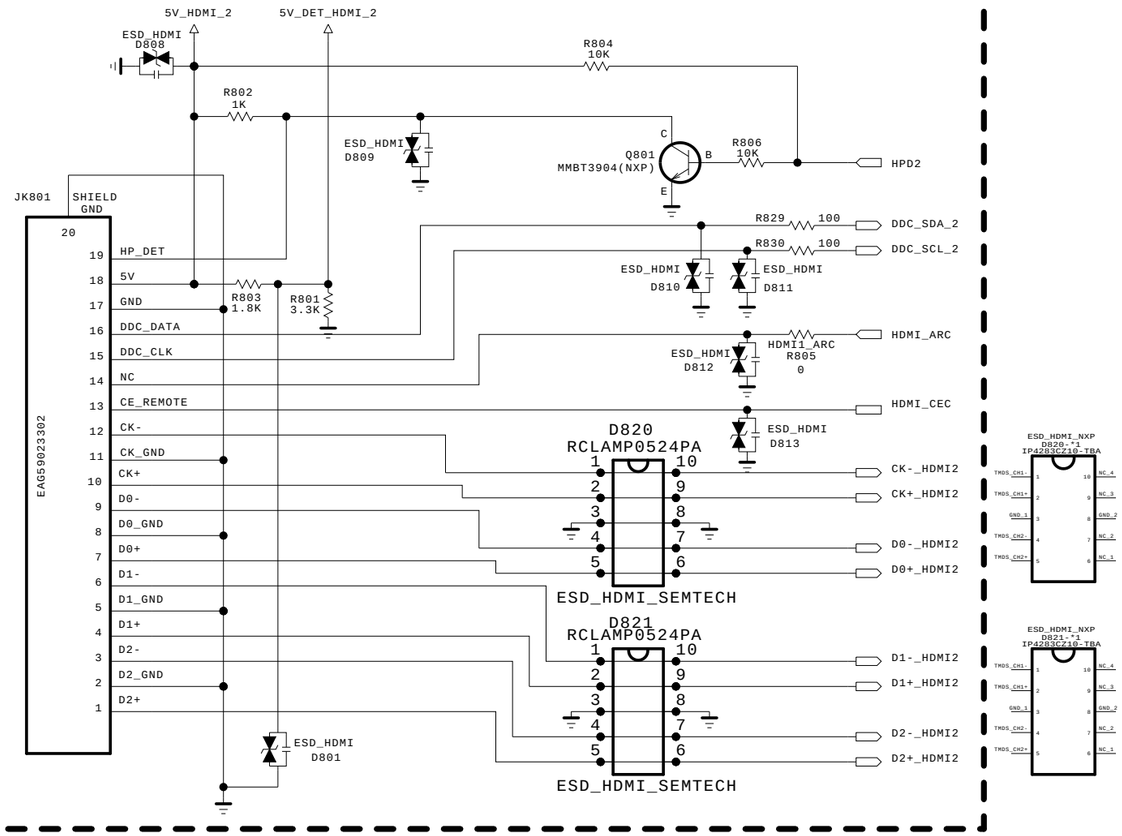
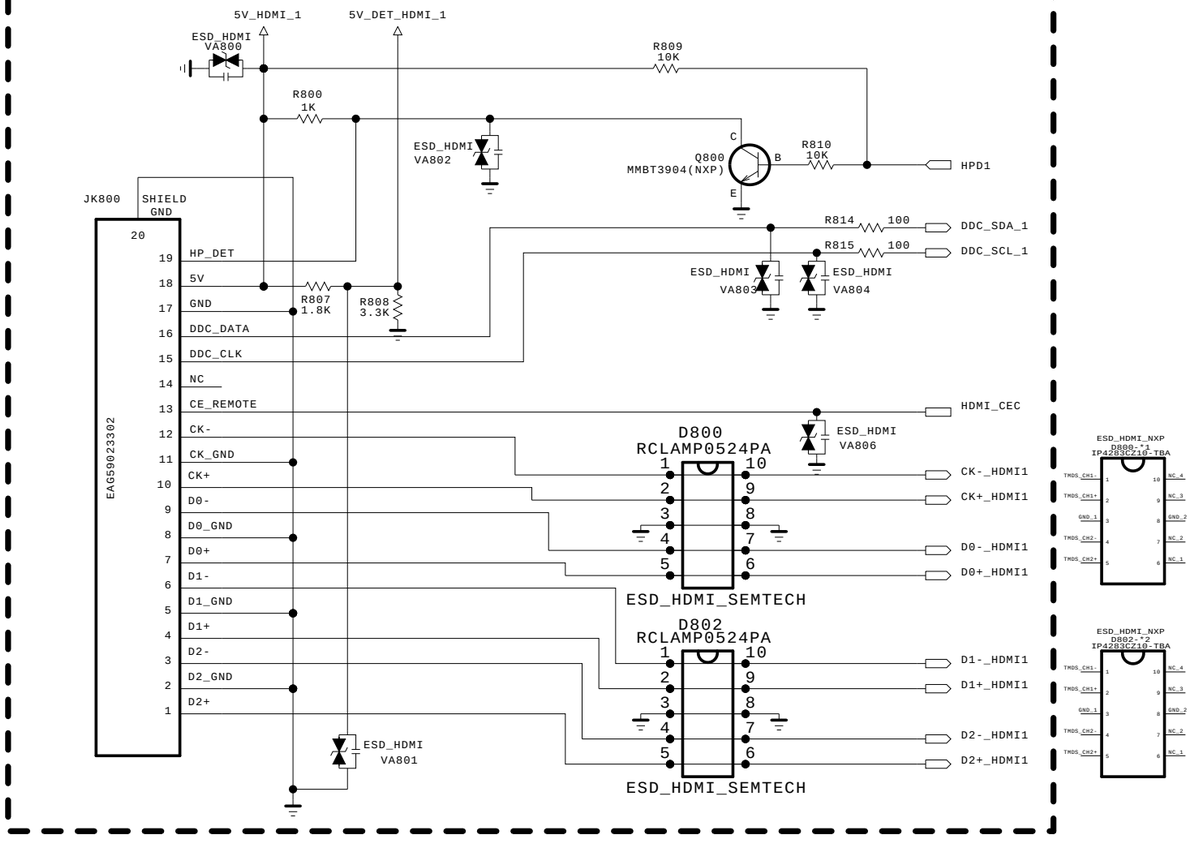
HDMI(REAR 2 Without MHL)

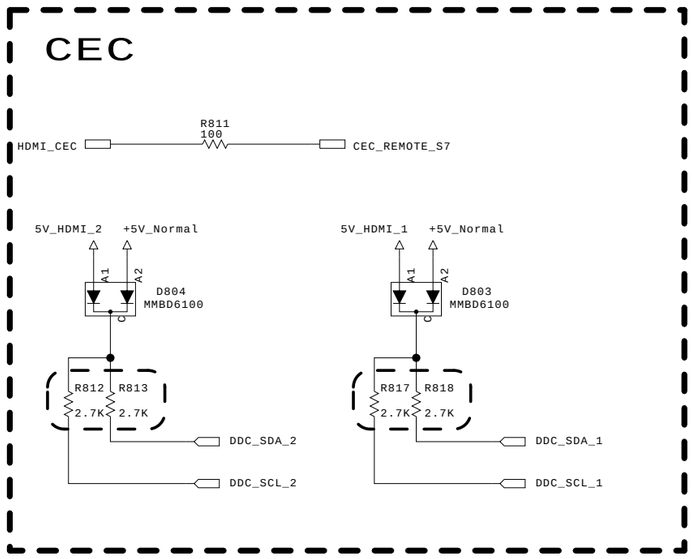
HDMI_1(ARC)



HDMI_2



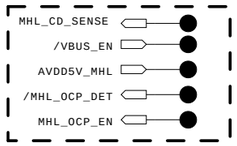
CEC



EU NOT USED TP (LN52_ERRC)

SIDE HDMI DELETE

MHL DELETE



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MODEL	NC4_S7LRM	DATE	2012/11/28
BLOCK	Adapter_HDMI_R2_LN52	SHEET	67

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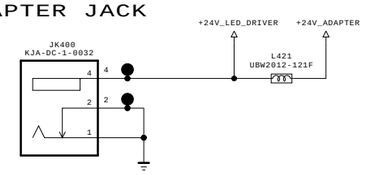
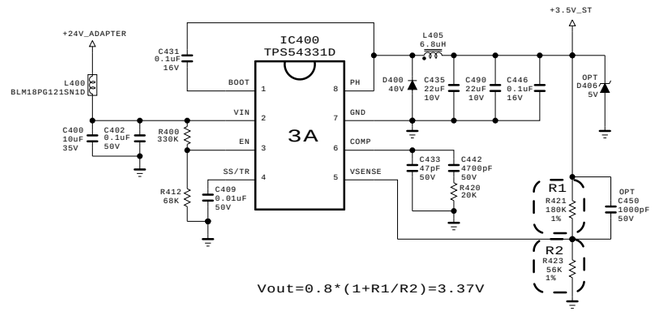
L13 Adapter POWER BLOCK

ADAPTER JACK

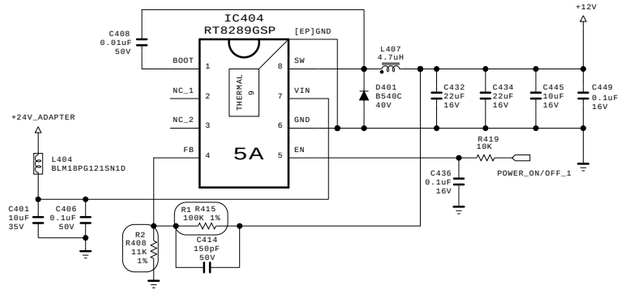


+24V_ADAPTER -> +3.5V_ST



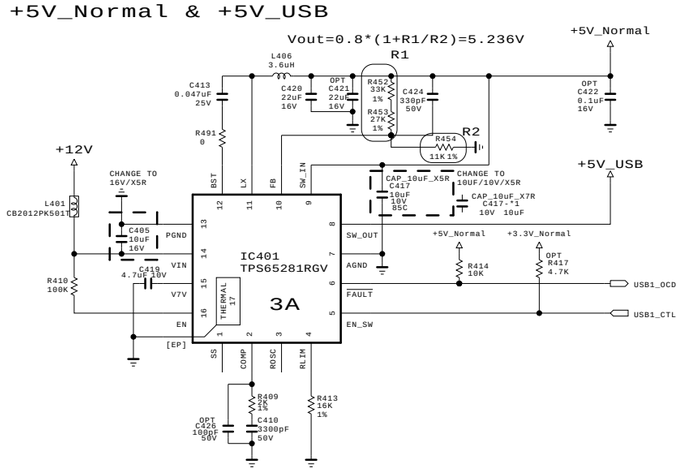
Vout=0.8*(1+R1/R2)=3.37V

+24V_ADAPTER -> +12V

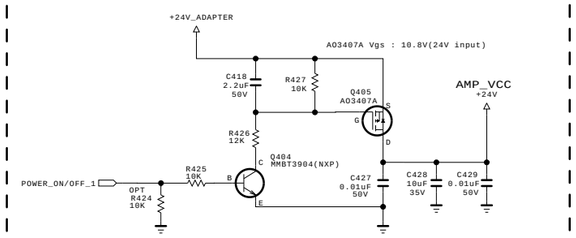


Vout=1.222*(1+R1/R2)=12.33V

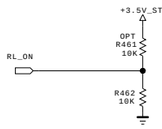
+12V -> +5V_Normal & +5V_USB



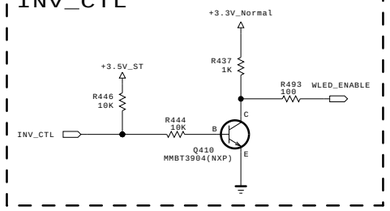
+24V_AMP_VCC



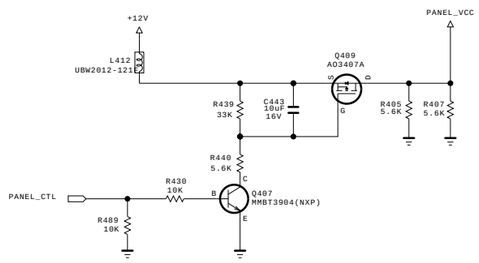
RL_ON



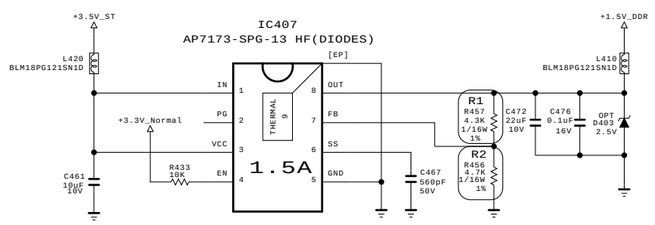
INV_CTL



+12V -> PANEL_VCC



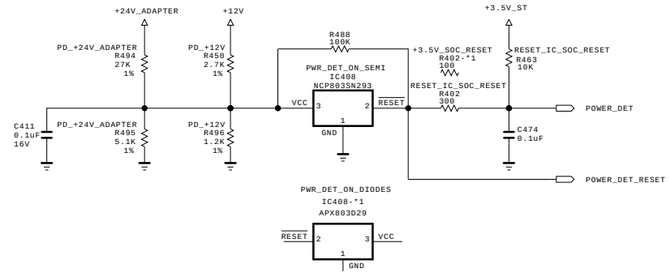
+3.5V_ST -> +1.5V_DDR



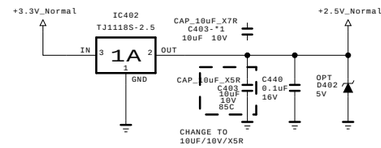
Vout=0.8*(1+R1/R2)=1.5319

Power_DET

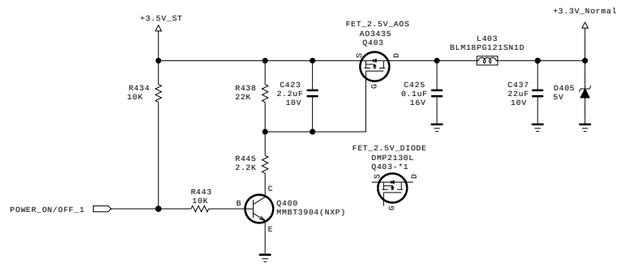
PD_+12V --> 3.69V
PD_+24V_ADAPTER --> 3.81V



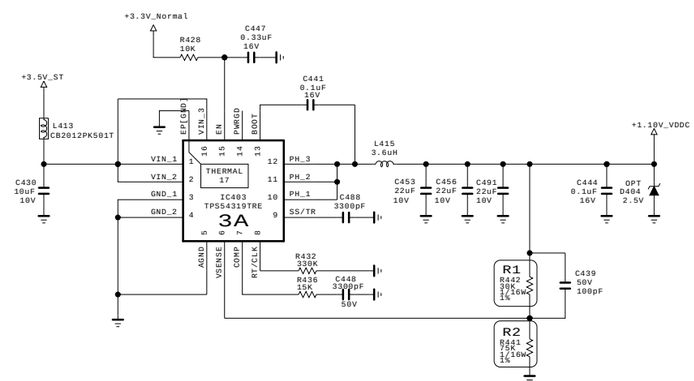
+3.3V_Normal -> +2.5V_Normal



+3.5V_ST -> +3.3V_Normal



+3.5V_ST -> +1.10V_VDDC S7LRM core



Vout=0.827*(1+R1/R2)=1.1578V

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MODEL	NC4_S7LRM	DATE	2013/04/17
BLOCK	Adapter Power	SHEET	68

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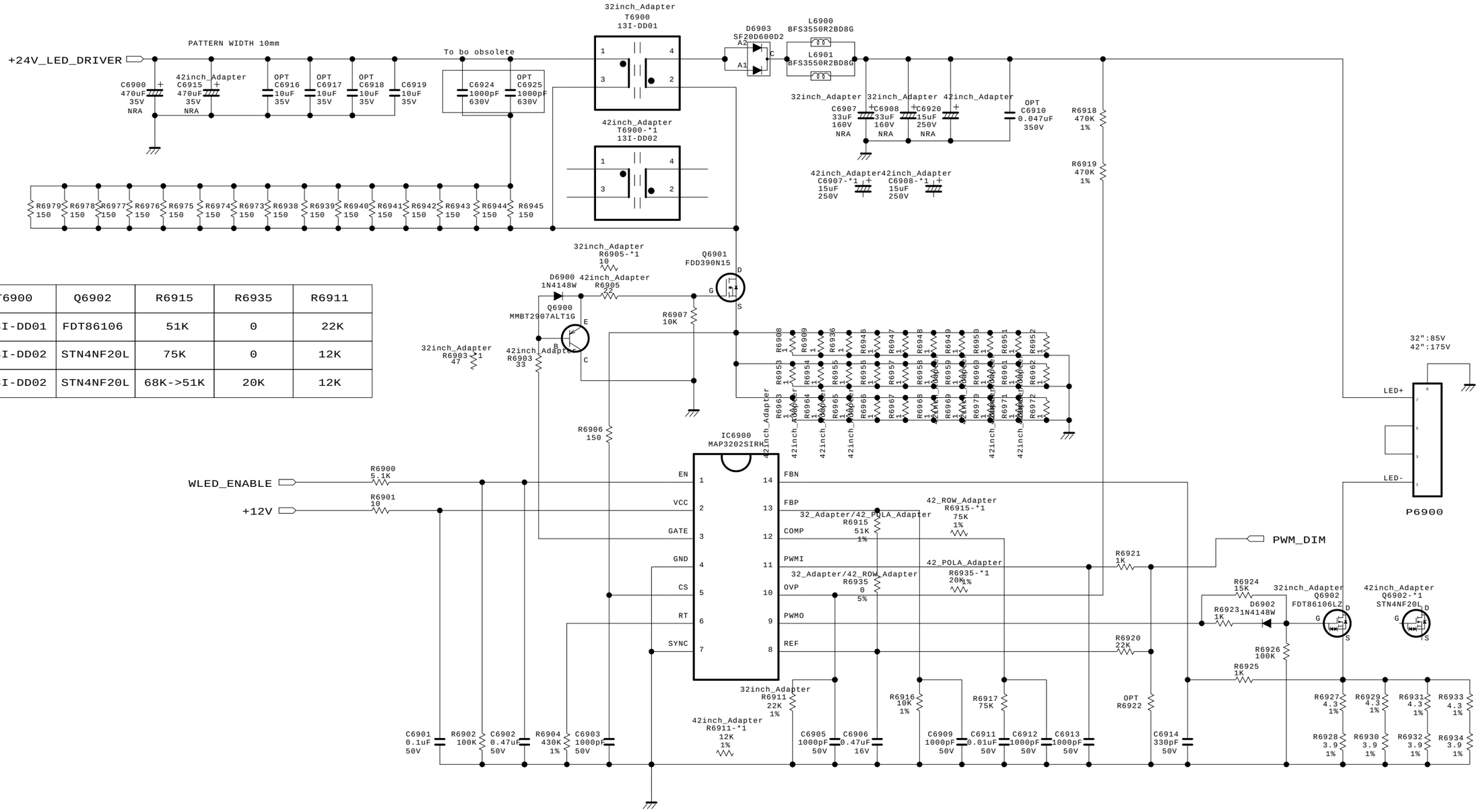

MODEL	T6900	Q6902	R6915	R6935	R6911
32 ROW/POLA 400mA	13I-DD01	FDT86106	51K	0	22K
42 ROW 285mA	13I-DD02	STN4NF20L	75K	0	12K
42 POLA 300mA	13I-DD02	STN4NF20L	68K->51K	20K	12K

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MODEL	NC4_S7LRM	DATE	2013/04/04
BLOCK	Adapter LED Driver	SHEET	69

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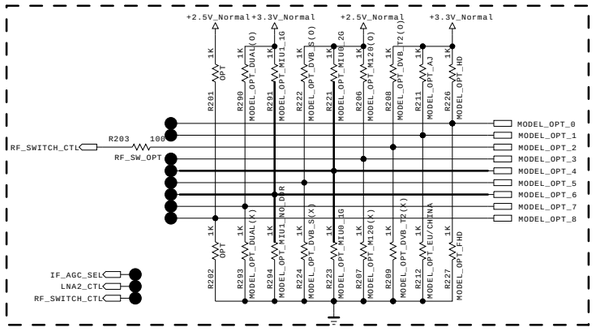
MODEL OPTION



MODEL OPTION

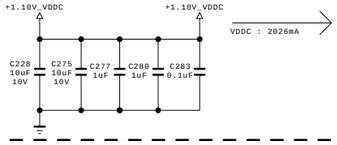
PIN NAME	PIN NO	LOW	HIGH
MODEL_OPT_0	AB3	FHD	HD
MODEL_OPT_1	F4	PHM_OFF	PHM_ON
MODEL_OPT_2	AB2	NON_DVB_T2	DVB_T2
MODEL_OPT_3	T25	NON_M120	M120
MODEL_OPT_4	U23	MIU0-128M	MIU0-256M
MODEL_OPT_5	T24	NON_DVB_S	DVB_S
MODEL_OPT_6	B8	MIU1-NO_DDR	MIU1-128M
MODEL_OPT_7	A8	NON_DUAL_STREAM	DUAL_STREAM

* Dual Stream is only Korea 3D spec

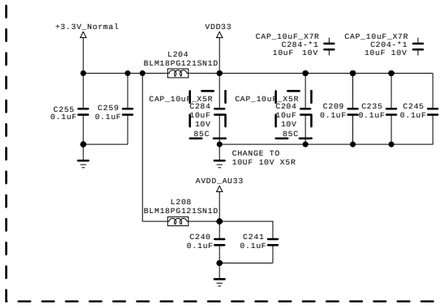
Memory OPTION

Memory	MODEL_OPT_4 PIN NO.U23	MODEL_OPT_6 PIN NO. B8	Note
128M	0	0	
128M+128M	0	1	
256M	1	0	
256M+128M	1	1	Ginga

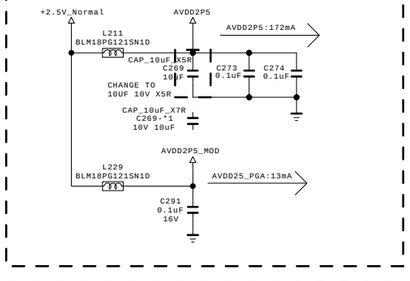
VDDC 1.05V



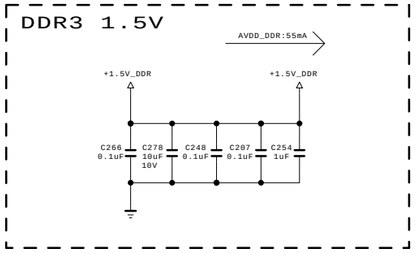
Normal Power 3.3V



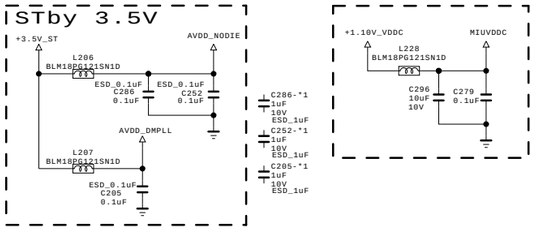
Normal 2.5V



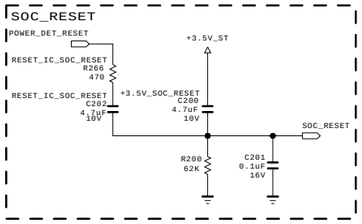
DDR3 1.5V



STby 3.5V

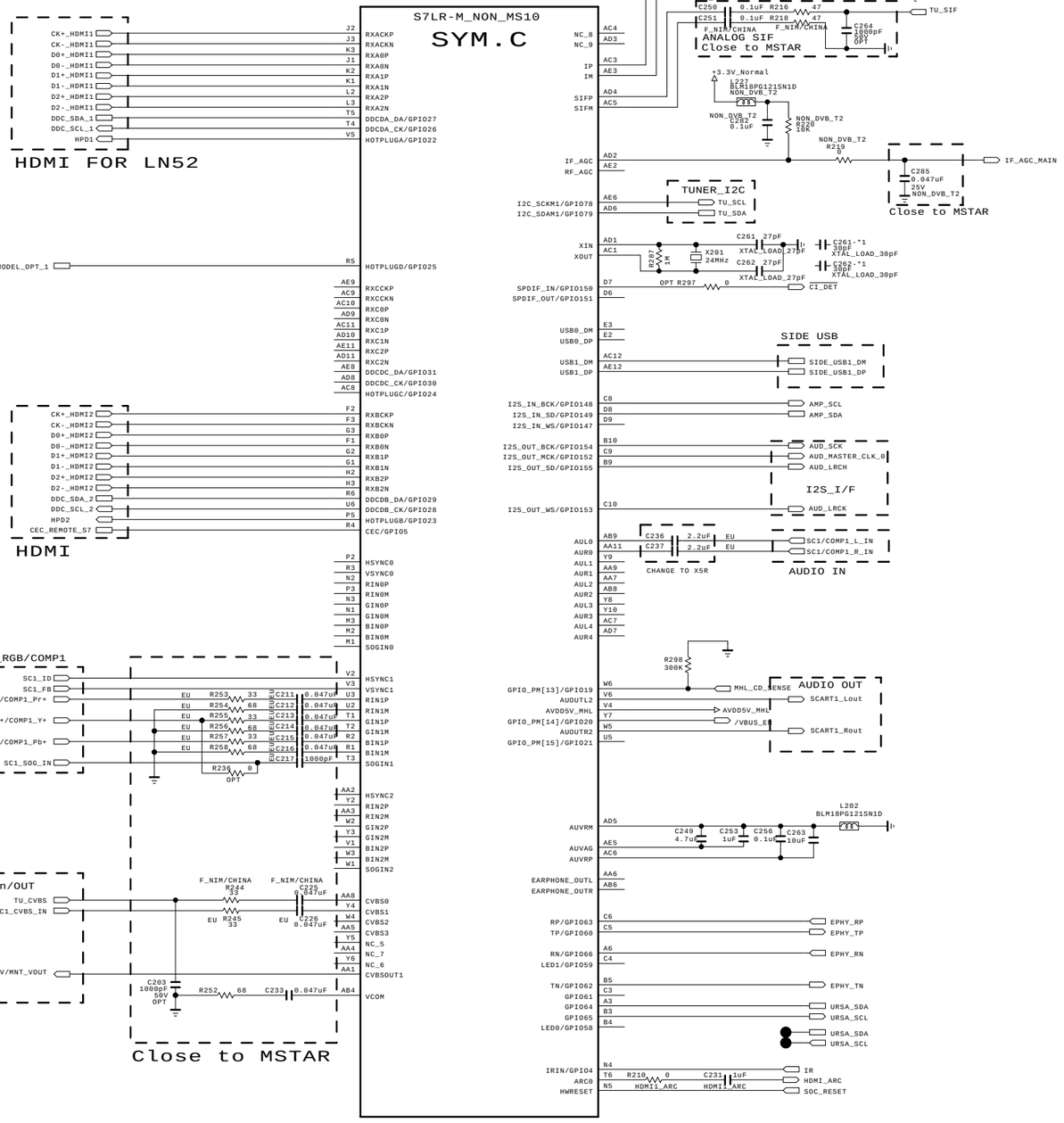


SOC_RESET



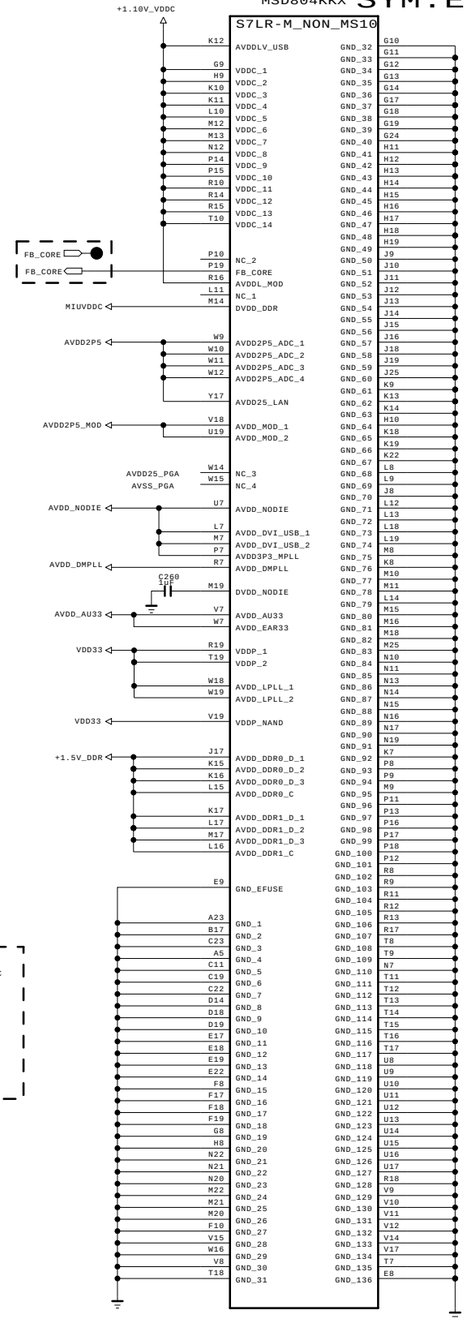
IC101 MSD804KKX SYM.C

S7LR-M_NON_MS10



IC101 MSD804KKX SYM.E

S7LR-M_NON_MS10



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MODEL	NC4_S7LRM	DATE	2013/04/17
BLOCK	MAIN2_EU_LN52	SHEET	2

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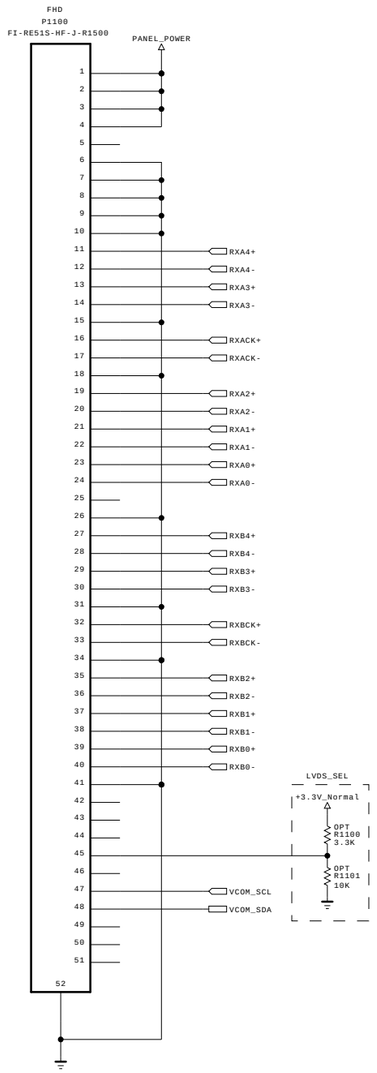
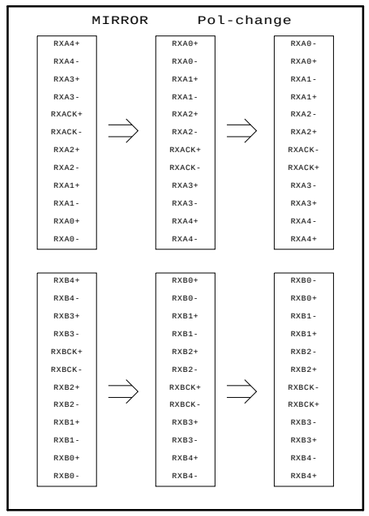
LN52_LVDS (EU)

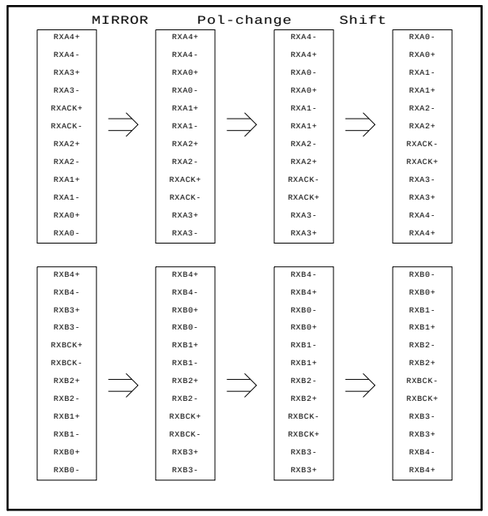
[51Pin LVDS Non-Reverse Connector] (For FHD 60Hz)



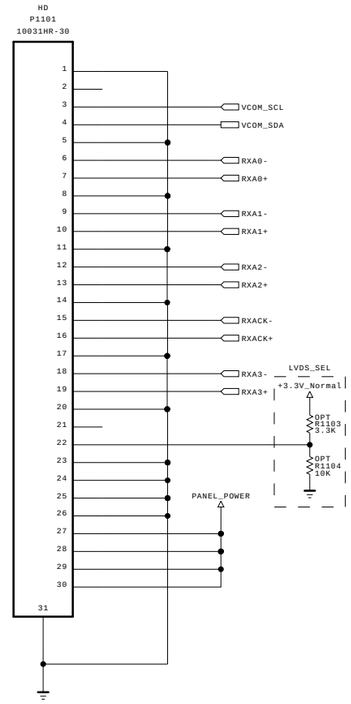
FOR FHD REVERSE(10bit)
Change in S7LR


MIRROR
Pol-change
RXA4+ RXA4- RXA3+ RXA3- RXACK+ RXACK- RXA2+ RXA2- RXA1+ RXA1- RXA0+ RXA0-
RXA0+ RXA0- RXA1+ RXA1- RXA2+ RXA2- RXACK+ RXACK- RXA3+ RXA3- RXA4+ RXA4-
RXA0- RXA0+ RXA1- RXA1+ RXA2- RXA2+ RXACK- RXACK+ RXA3- RXA3+ RXA4- RXA4+
RXB4+ RXB4- RXB3+ RXB3- RXBCK+ RXBCK- RXB2+ RXB2- RXB1+ RXB1- RXB0+ RXB0-
RXB0+ RXB0- RXB1+ RXB1- RXB2+ RXB2- RXBCK+ RXBCK- RXB3+ RXB3- RXB4+ RXB4-
RXB0- RXB0+ RXB1- RXB1+ RXB2- RXB2+ RXBCK- RXBCK+ RXB3- RXB3+ RXB4- RXB4+

FOR FHD REVERSE(8bit)
Change in S7LR

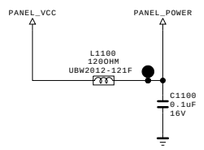

MIRROR
Pol-change
Shift
RXA4+ RXA4- RXA3+ RXA3- RXACK+ RXACK- RXA2+ RXA2- RXA1+ RXA1- RXA0+ RXA0-
RXA4+ RXA4- RXA0+ RXA0- RXA1+ RXA1- RXA2+ RXA2- RXACK+ RXACK- RXA3+ RXA3-
RXA4- RXA4+ RXA0- RXA0+ RXA1- RXA1+ RXA2- RXA2+ RXACK- RXACK+ RXA3- RXA3+
RXA0- RXA0+ RXA1- RXA1+ RXA2- RXA2+ RXACK- RXACK+ RXA3- RXA3+ RXA4- RXA4+
RXB4+ RXB4- RXB3+ RXB3- RXBCK+ RXBCK- RXB2+ RXB2- RXB1+ RXB1- RXB0+ RXB0-
RXB4+ RXB4- RXB0+ RXB0- RXB1+ RXB1- RXB2+ RXB2- RXBCK+ RXBCK- RXB3+ RXB3-
RXB4- RXB4+ RXB0- RXB0+ RXB1- RXB1+ RXB2- RXB2+ RXBCK- RXBCK+ RXB3- RXB3+
RXB0- RXB0+ RXB1- RXB1+ RXB2- RXB2+ RXBCK- RXBCK+ RXB3- RXB3+ RXB4- RXB4+

[30Pin LVDS Connector] (For HD 60Hz_Normal)

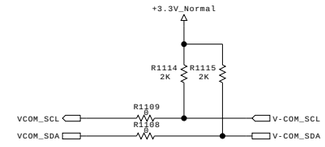


EU pin assign is different from NON EU.
Because of position of HD wafer.

PANEL_VCC -> PANEL_POWER



V-COM I2S



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MODEL	NC4_S7LRM	DATE	2013/02/28
BLOCK	LN52_LVDS_EU	SHEET	71

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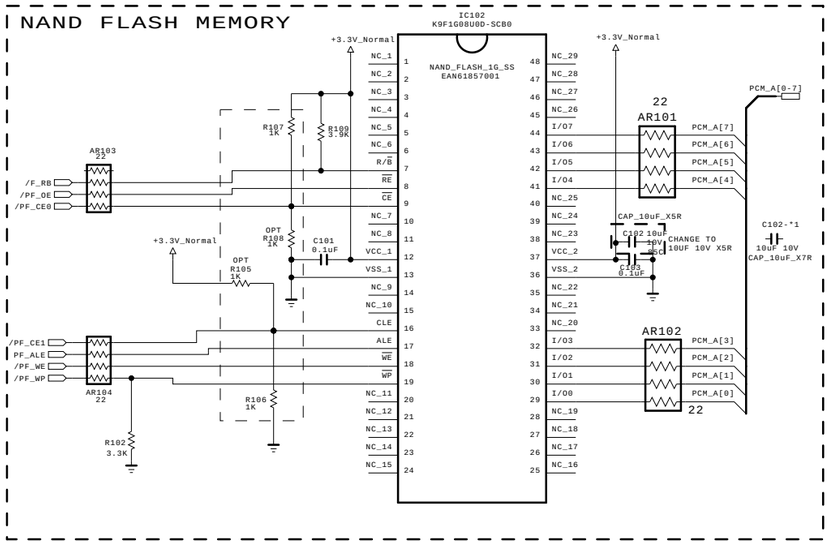
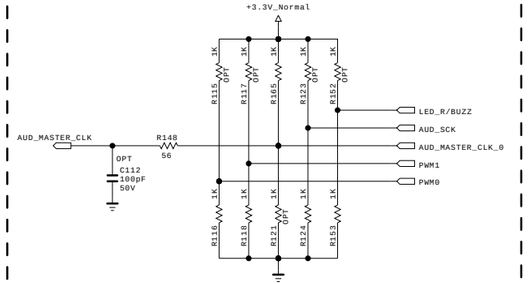
NAND FLASH MEMORY



<CHIP Config(LED_R/BUZZ)>
Boot from SPI CS1N(EXT_FLASH) 1'b0
Boot from SPI_CS0N(INT_FLASH) 1'b1

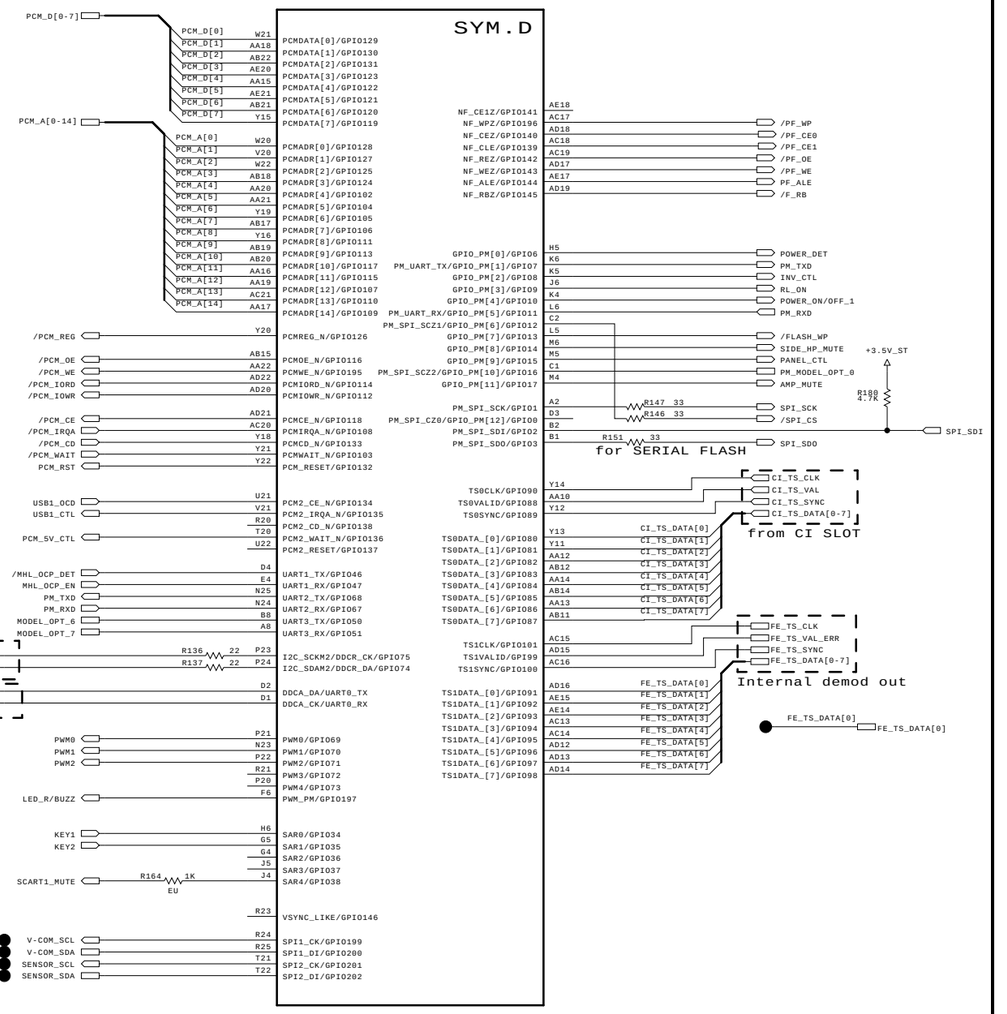
<CHIP Config>
(I2S_OUT_BCK,I2S_OUT_MCK,PAD_PWM1PAD_PWM0)

B51_no_EJ	: 4'b0000	Boot from 8051 with SPI flash
SB51_WOS	: 4'b0001	Secure B51 without scramble
SB51_WS	: 4'b0010	Secure B51 with scramble
MIPS_SPE_NO_EJ	: 4'b0100	Boot from MIPS with SPI flash
MIPS_SPI_EJ_1	: 4'b0101	Boot from MIPS with SPI flash
MIPS_SPI_EJ_2	: 4'b0110	Boot from MIPS with SPI flash
MIPS_WOS	: 4'b1001	Secure MIPS without scramble
MIPS_WS	: 4'b1010	Scerur MIPS with SCRAMBLE



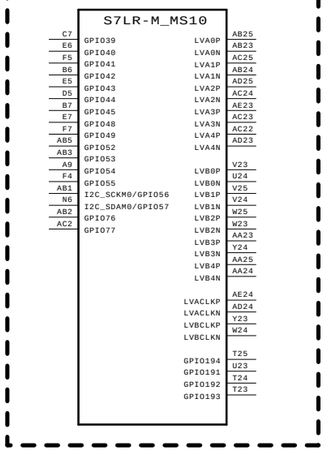
S7LR-M_NON_MS10
IC101
MSD804KKX

SYM.D

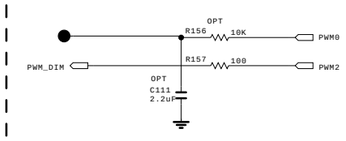


IC101-*1
LGE2121-MS (M1_L13_MS10)

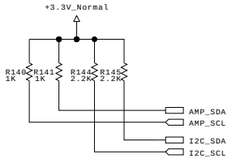
S7LR-M_MS10



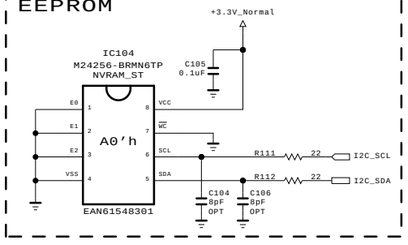
DIMMING

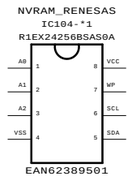


I2C

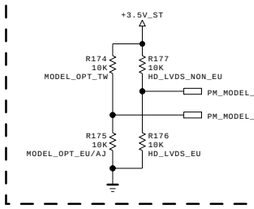


EEPROM





PM MODEL OPTION

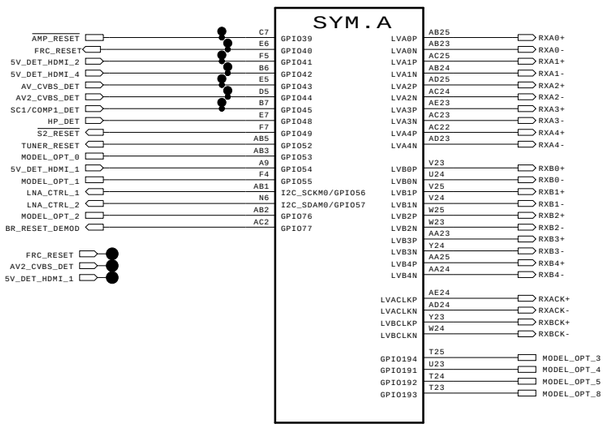


PM_MODEL_OPT_0
HIGH : HD_NON_EU
LOW : HD_EU
HD_LVDS_pattern is different.
Between EU and NON_EU

PM_MODEL_OPT_1
HIGH : TAIWAN
LOW : EU,AJ
NC : Other
for 1 Binary

S7LR-M_NON_MS10
IC101
MSD804KKX

SYM.A



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MODEL	NC4_S7LRM_Adapter	DATE	2013/01/10
BLOCK	MAIN1_EU_OS	SHEET	1

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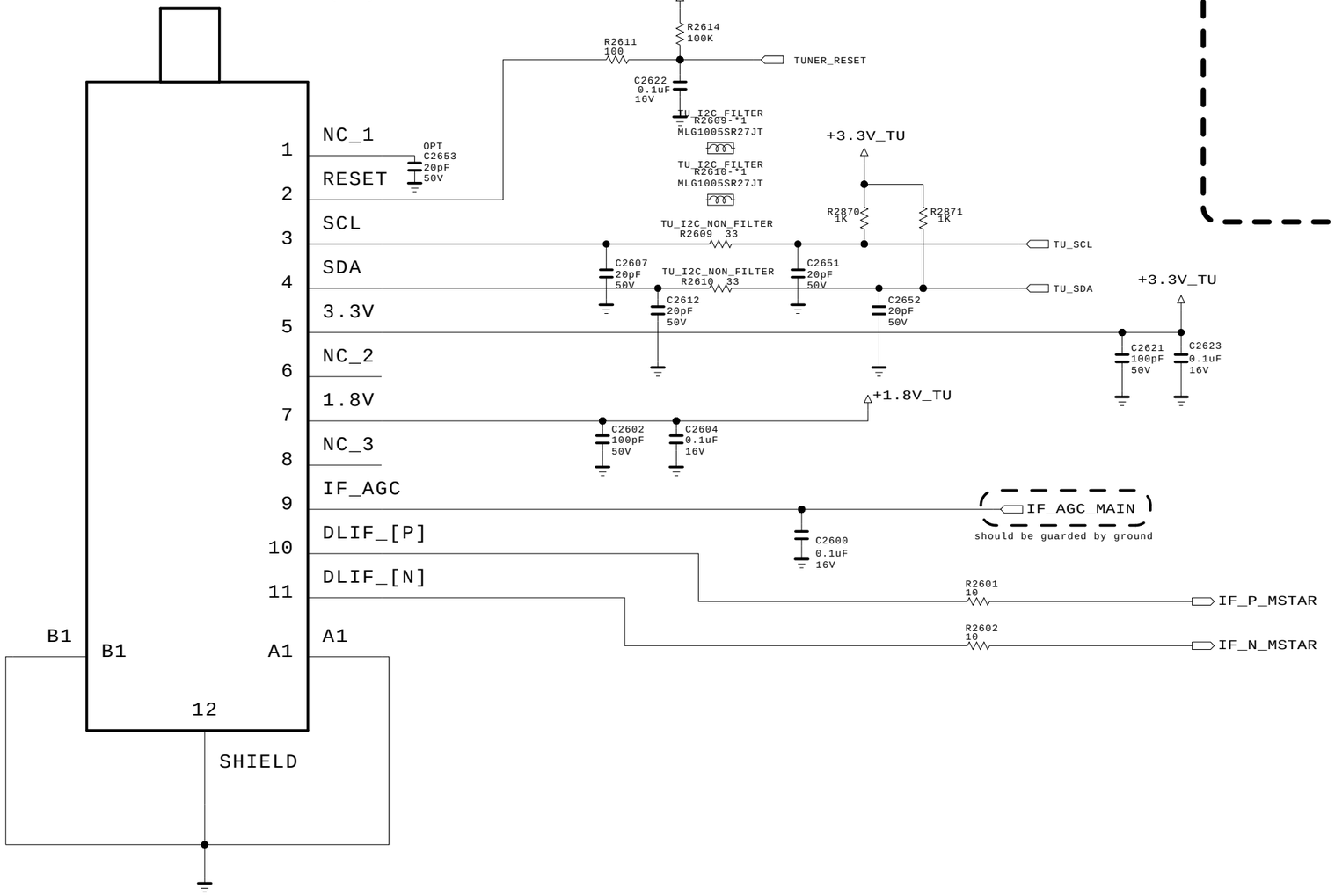
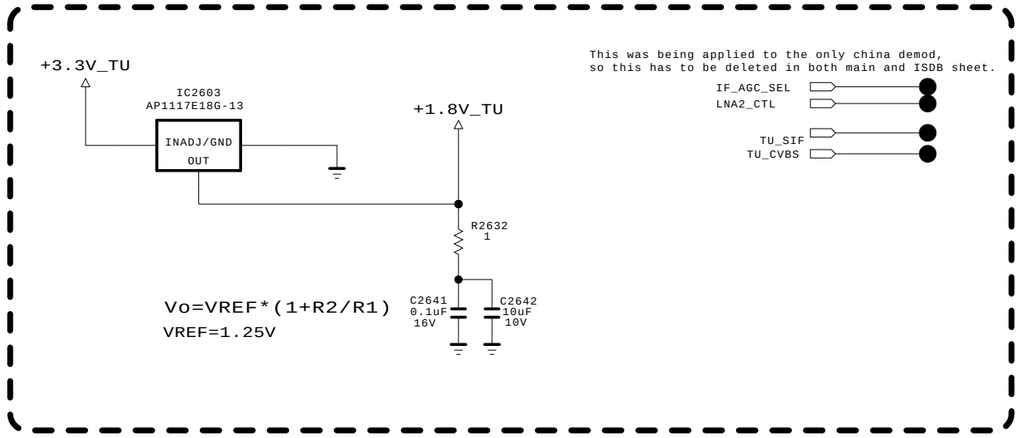
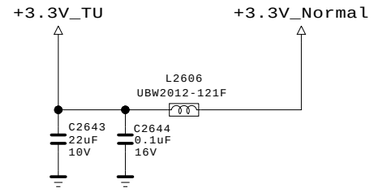
NETCAST4.0_EU_TUNER_BLOCK

TU2601
TDSS-G501D(B)



Close to the tuner





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LG ELECTRONICS

MODEL	NC4_S7LRM	DATE	2013/02/05
BLOCK	TUNER_EU_ERRC	SHEET	85

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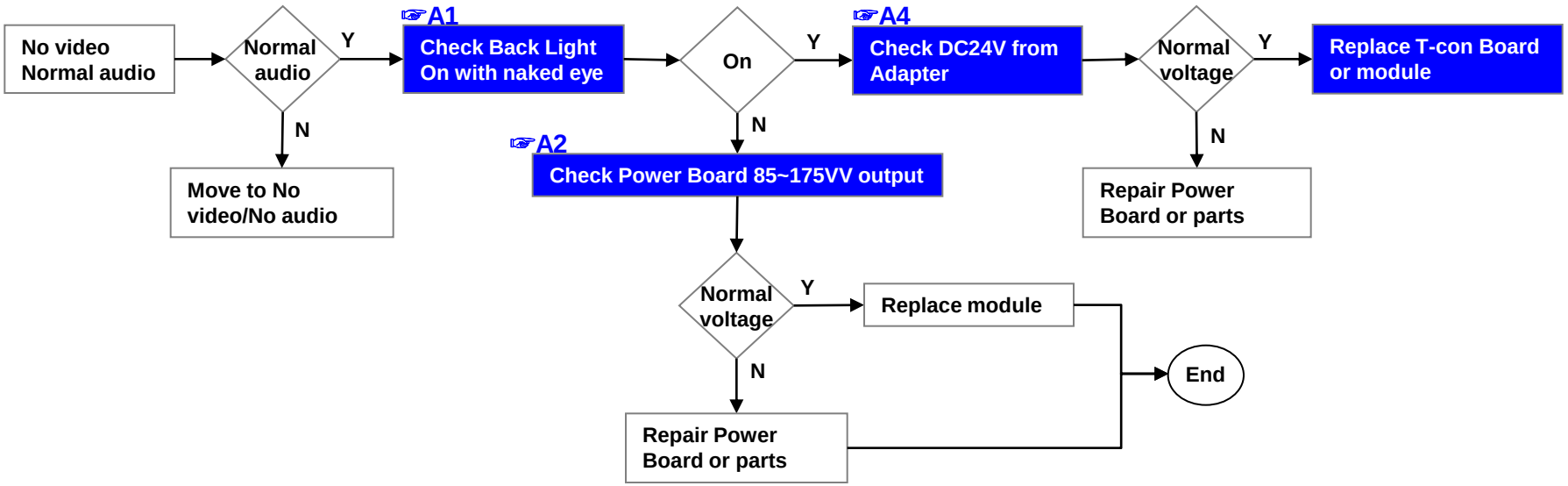
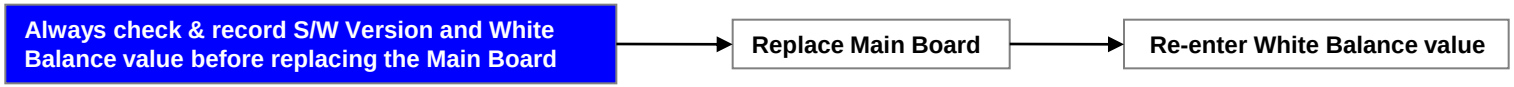
Life's Good

LCD TV	Error symptom	A. Video error	Established date	2013. 01 .09	
		No video/ Normal audio	Revised date		1/14

First of all, Check whether all of cables between board is inserted properly or not.
(Main B/D, LVDS Cable, Speaker Cable, IR B/D Cable,,,)



※Precaution ☞A6 & A3


Always check & record S/W Version and White Balance value before replacing the Main Board
Replace Main Board
Re-enter White Balance value

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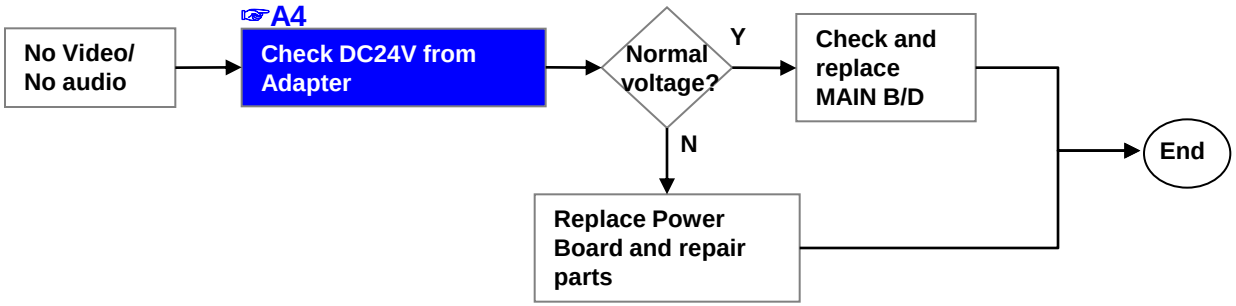
LCD TV	Error symptom	A. Video error	Established date	2013. 01 .09	
		No video/ No audio	Revised date		2/14



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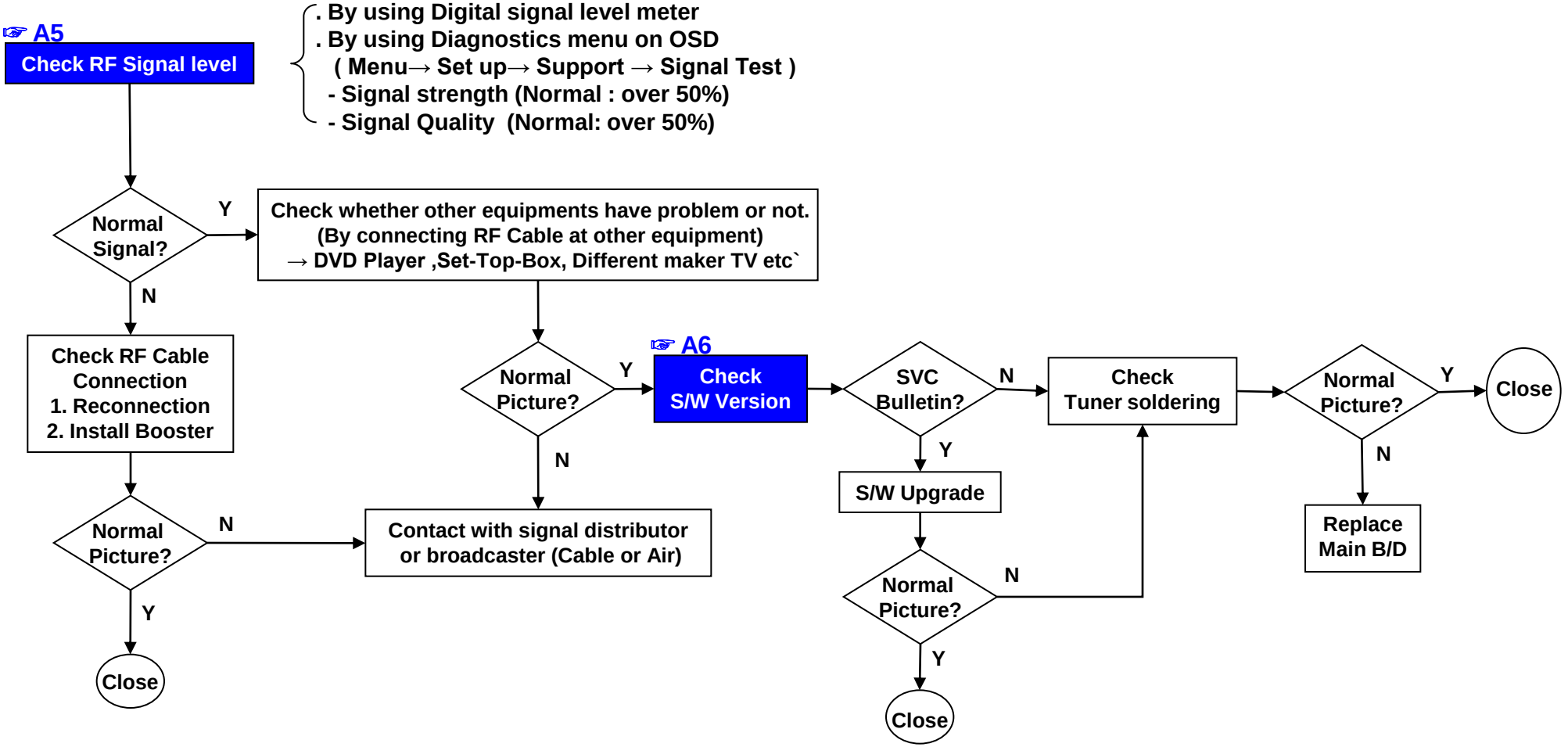
LGE Internal Use Only

LCD TV	Error symptom	A. Video error	Established date	2013. 01 .09	
		Picture broken/ Freezing	Revised date		3/14



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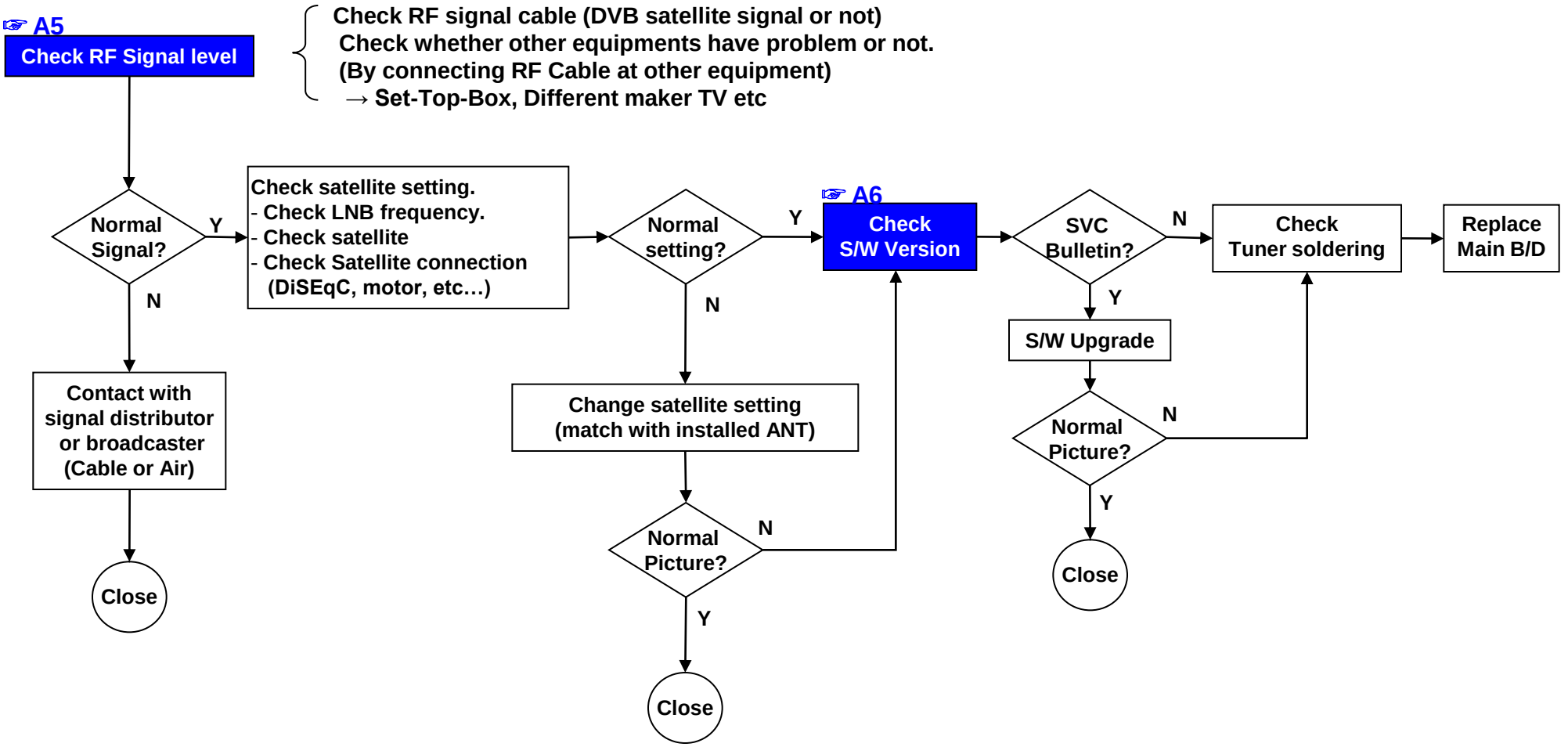
LGE Internal Use Only

LCD TV	Error symptom	A. Video error	Established date	2013. 01 .09	
		Tuning fail, Picture broken/ Freezing	Revised date		4/14



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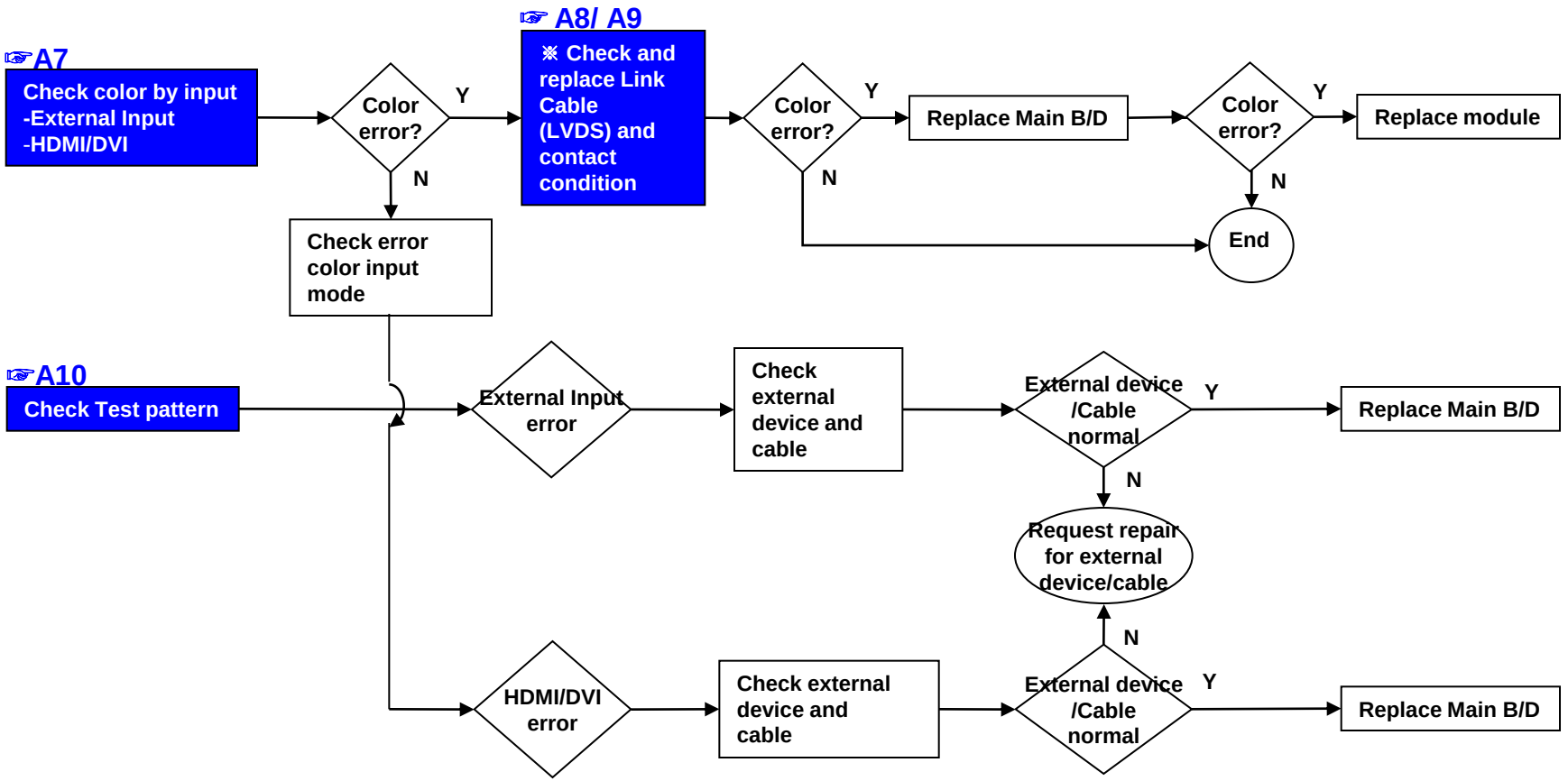
LCD TV	Error symptom	A. Video error	Established date	2013. 01 .09	
		Color error	Revised date		5/14



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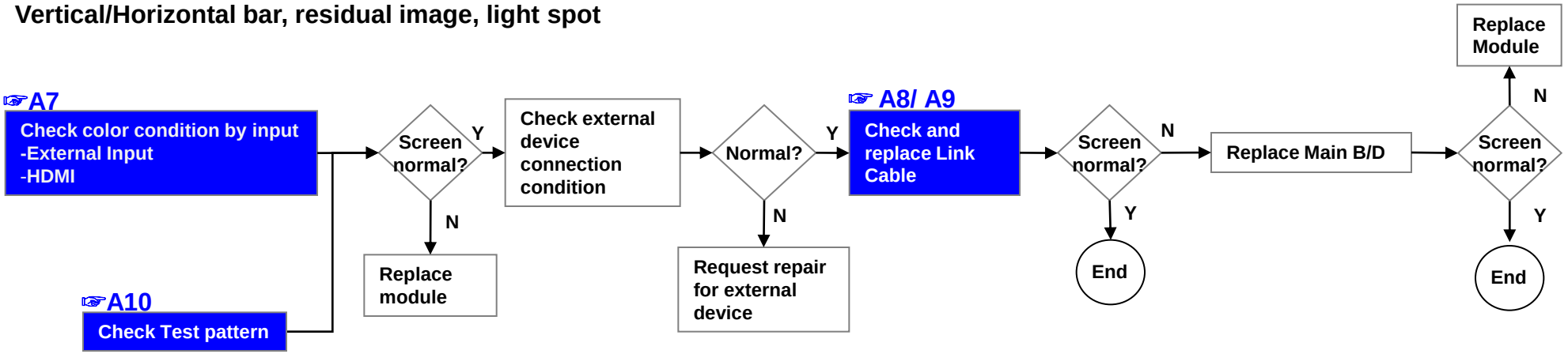
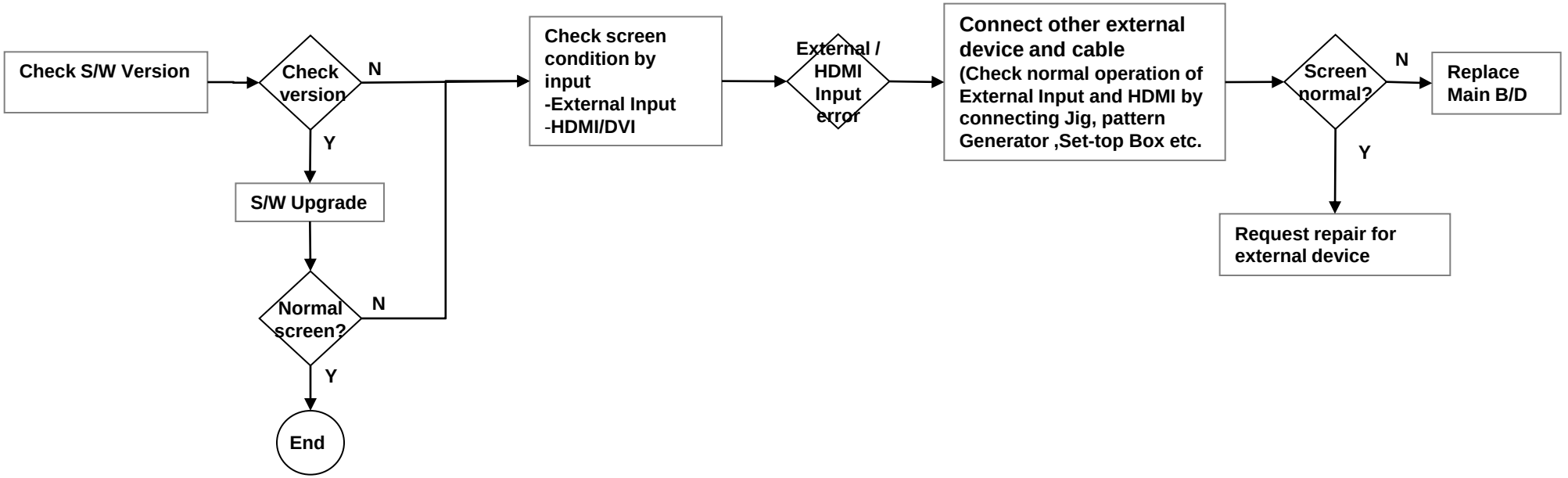
LCD TV	Error symptom	A. Video error	Established date	2013. 01 .09	
		Vertical / Horizontal bar, residual image, light spot, external device color error	Revised date		6/14

Vertical/Horizontal bar, residual image, light spot



External device screen error-Color error



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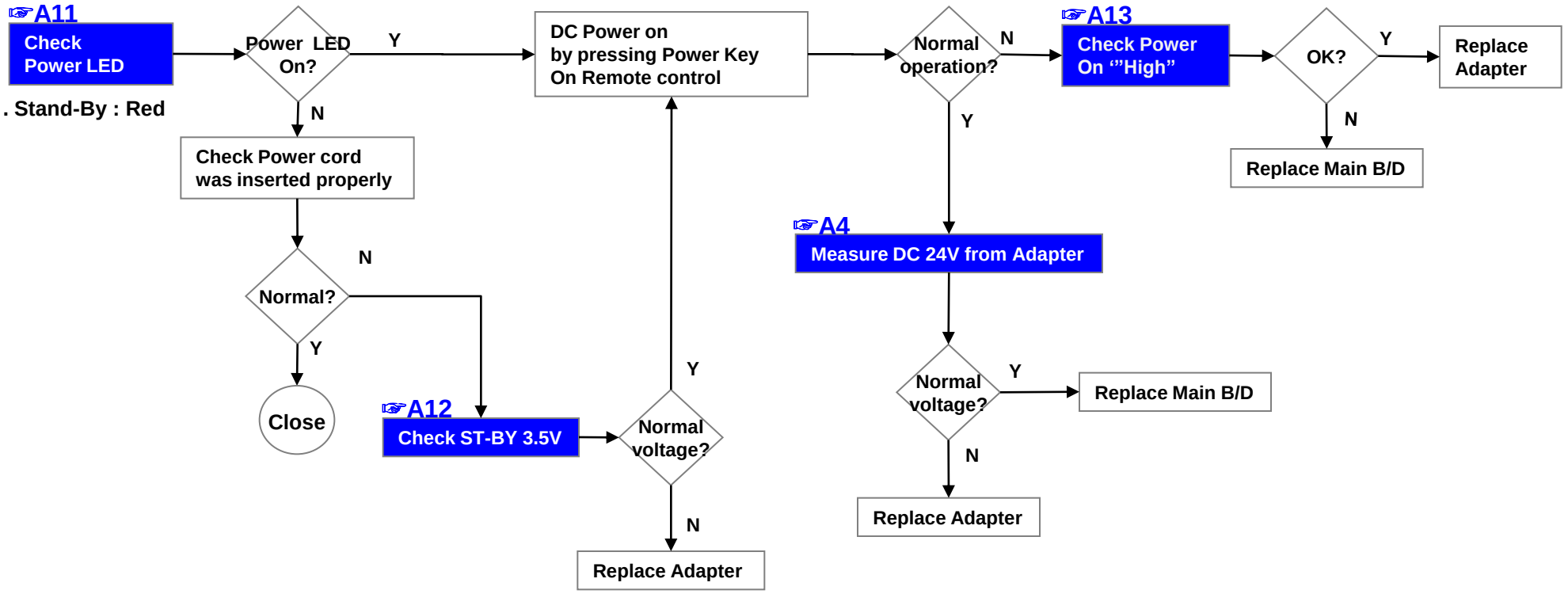
LCD TV	Error symptom	B. Power error	Established date	2013. 01 .09	
		No power	Revised date		7/14



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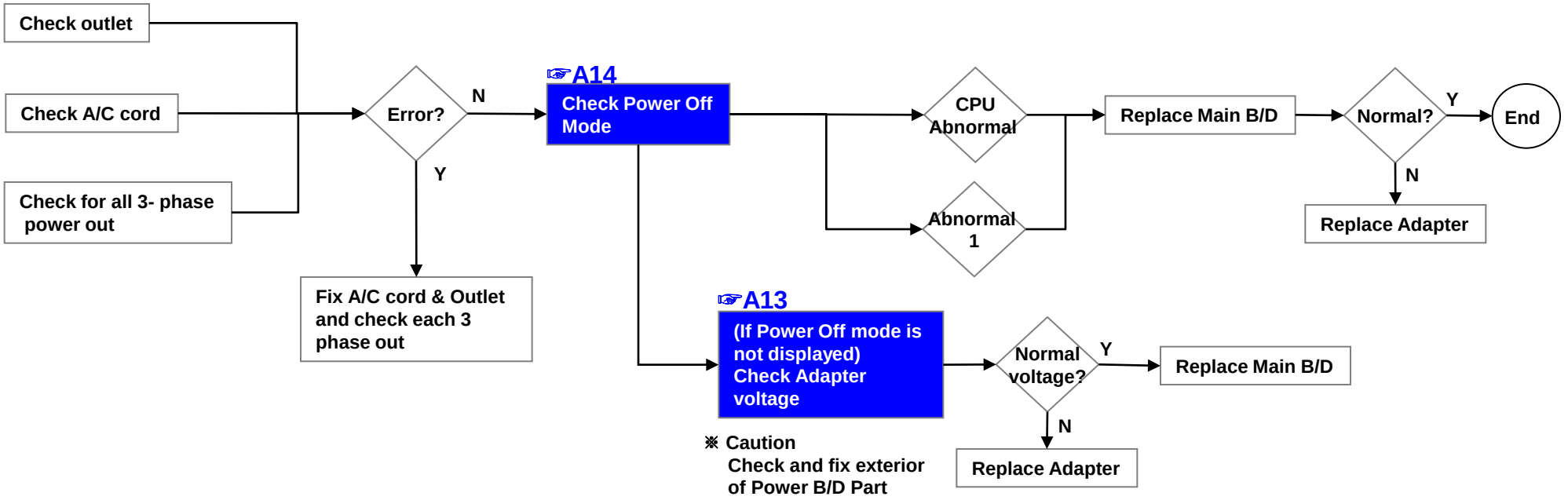
LCD TV	Error symptom	B. Power error	Established date	2013. 01 .09	
		Off when on, off while viewing, power auto on/off	Revised date		8/14



*** Please refer to the all cases which can be displayed on power off mode.**

Status	Power off List	Explanation
Normal	"POWEROFF_REMOTEKEY"	Power off by REMOTE CONTROL
	"POWEROFF_OFFTIMER"	Power off by OFF TIMER
	"POWEROFF_SLEEPTIMER"	Power off by SLEEP TIMER
	"POWEROFF_INSTOP"	Power off by INSTOP KEY
	"POWEROFF_AUTOOFF"	Power off by AUTO OFF
	"POWEROFF_ONTIMER"	Power off by ON TIMER
	"POWEROFF_RS232C"	Power off by RS232C
	"POWEROFF_SWDOWN"	Power off by S/W Download
	"POWEROFF_UNKNOWN"	Power off by unknown status except listed case
Abnormal	"POWEROFF_ABNORMAL1"	Power off by abnormal status except CPU trouble
	"POWEROFF_CPUABNORMAL"	Power off by CPU Abnormal

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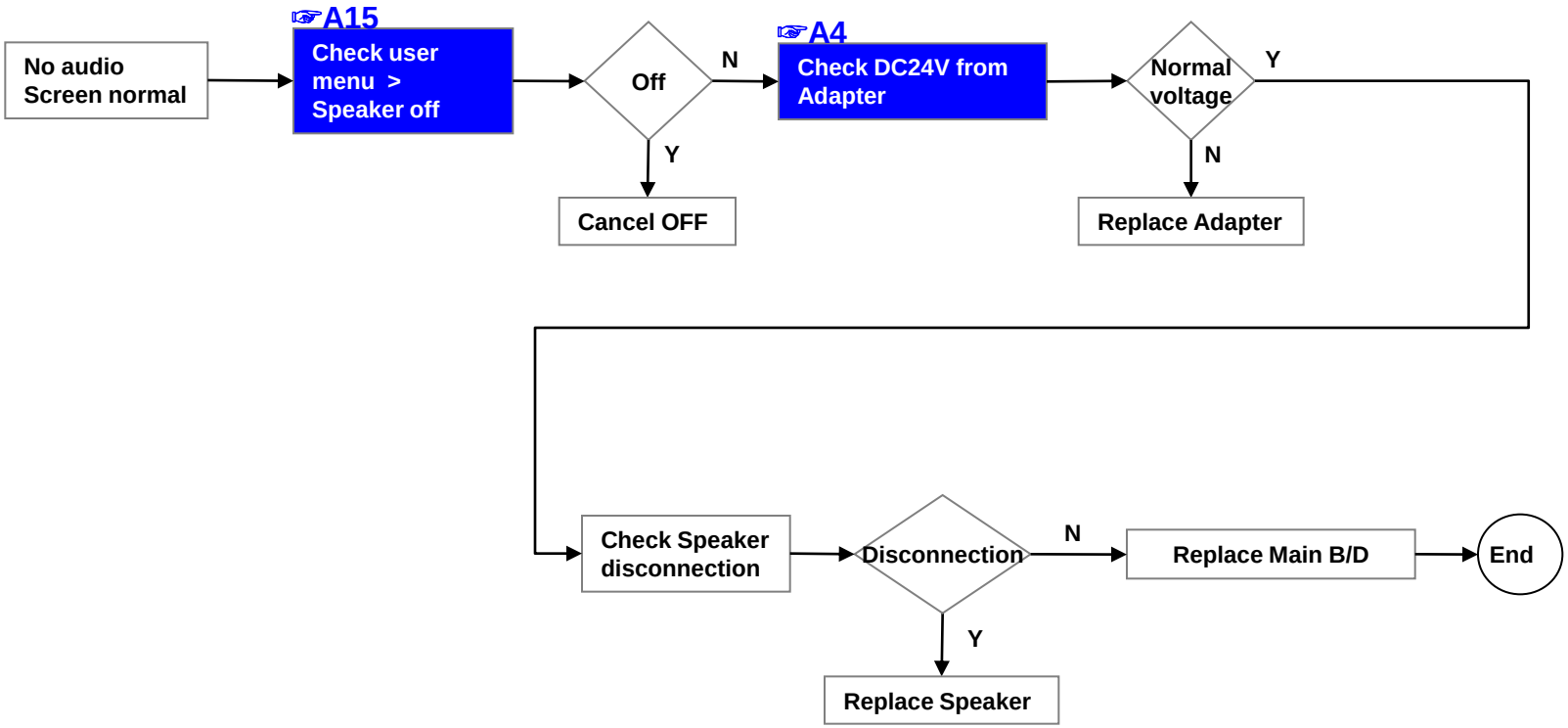
LCD TV	Error symptom	C. Audio error	Established date	2013. 01 .09	
		No audio/ Normal video	Revised date		9/14



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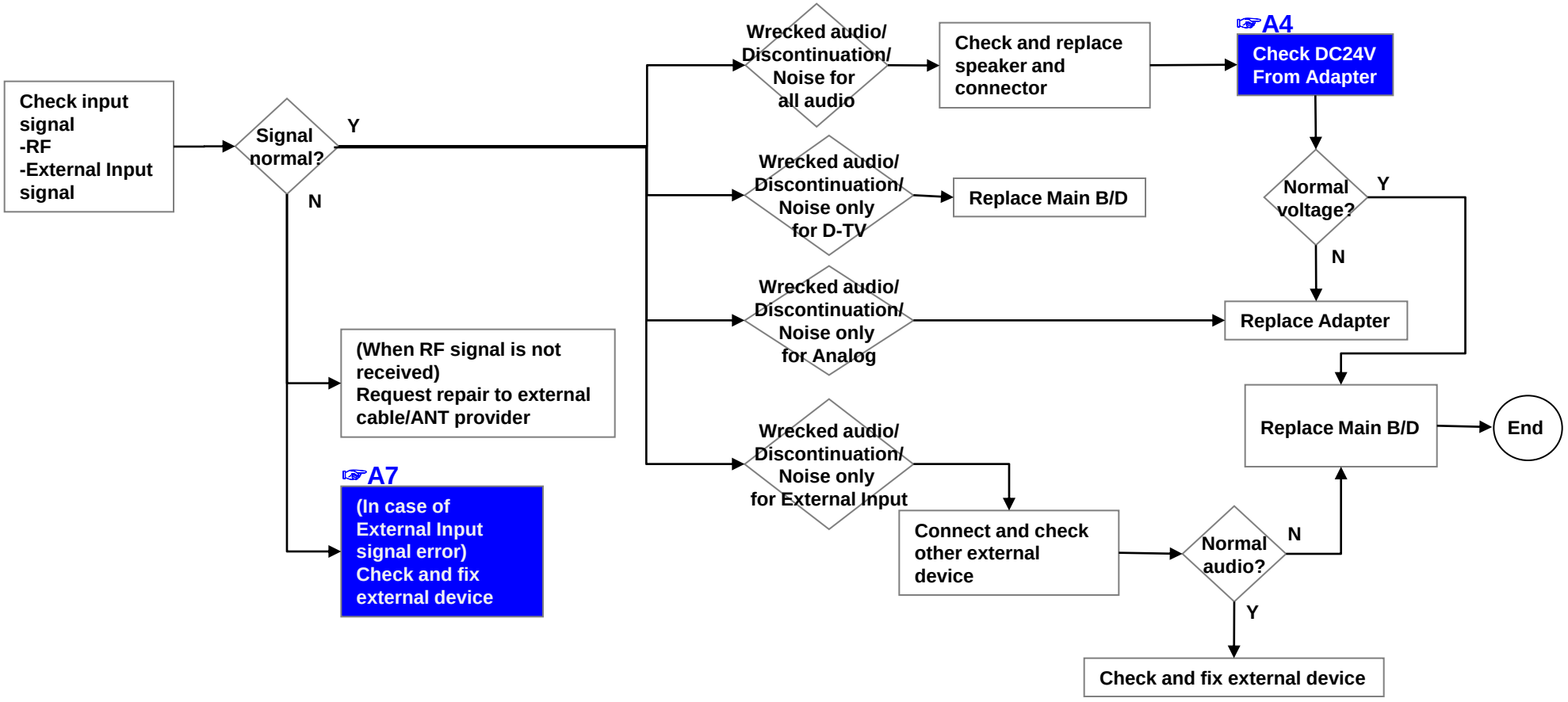
LCD TV	Error symptom	C. Audio error	Established date	2013. 01 .09	
		Wrecked audio/ discontinuation/noise	Revised date		10/14

- abnormal audio/discontinuation/noise is same after “Check input signal” compared to No audio



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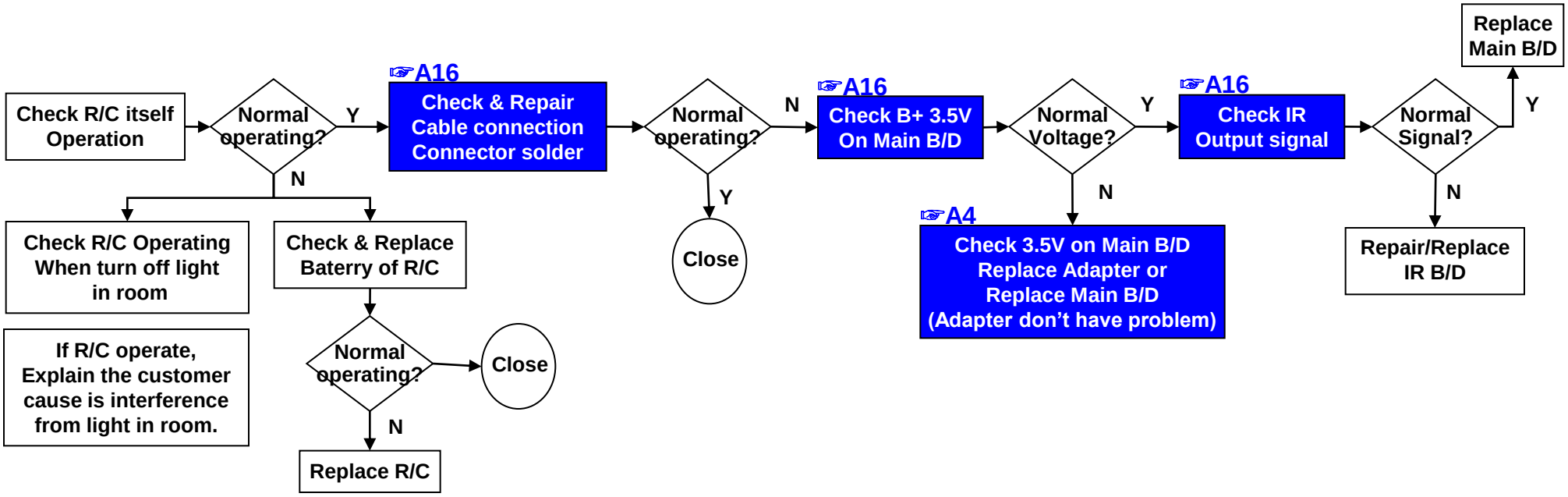
LCD TV	Error symptom	D. Function error	Established date	2013. 01 .09	
		Remote control & Local switch checking	Revised date		11/14

- Remote control(R/C) operating error



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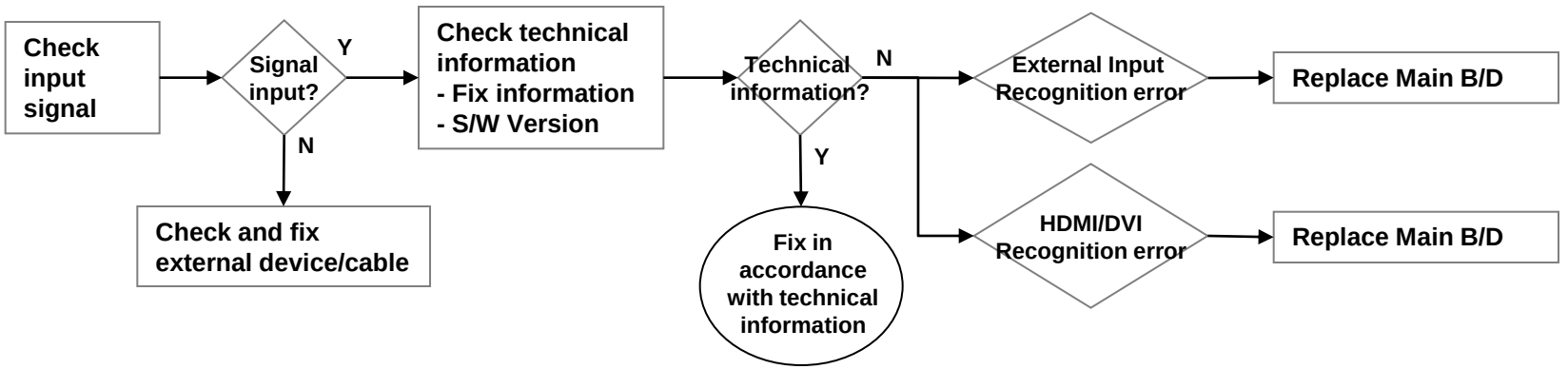
LCD TV	Error symptom	D. Function error	Established date	2013. 01 .09	
		External device recognition error	Revised date		12/14



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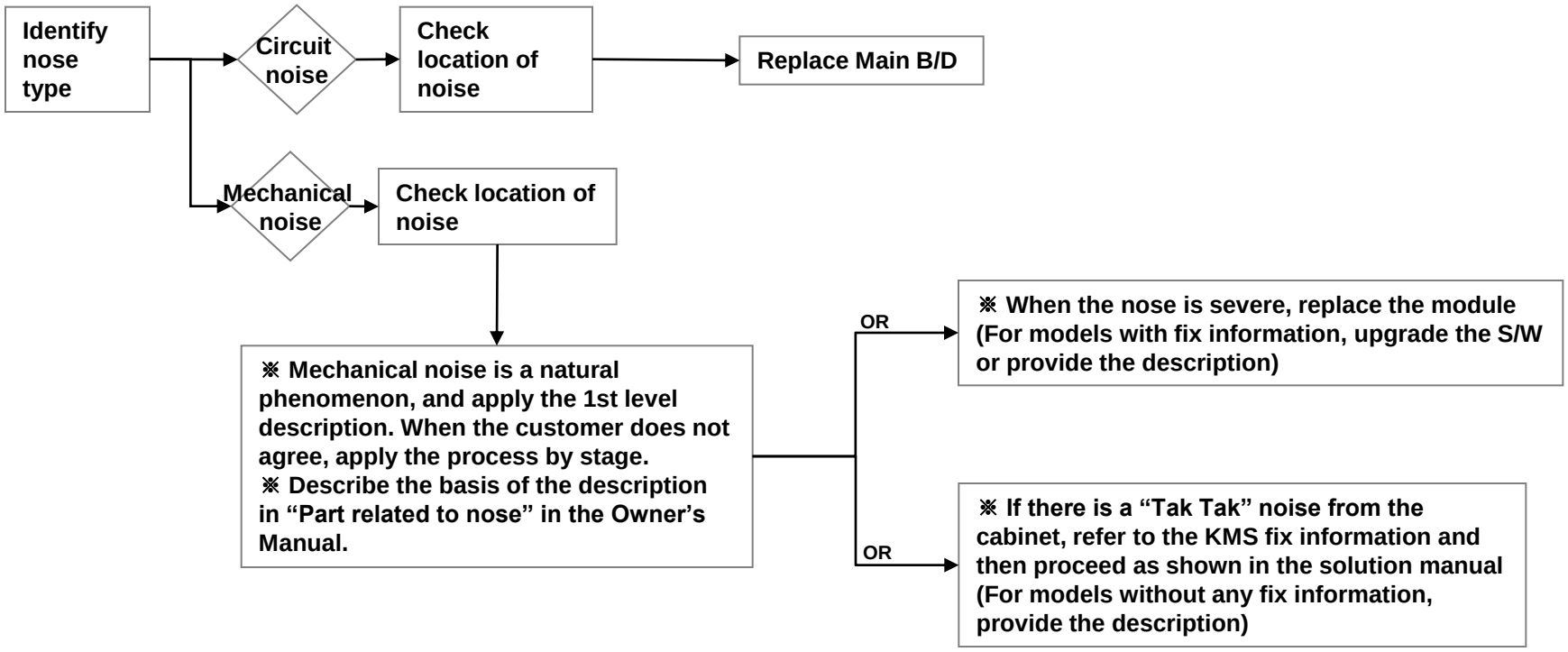
LCD TV	Error symptom	E. Noise	Established date	2013. 01 .09	
		Circuit noise, mechanical noise	Revised date		13/14


Identify nose type
Circuit noise
Check location of noise
Replace Main B/D
Mechanical noise
Check location of noise
※ Mechanical noise is a natural phenomenon, and apply the 1st level description. When the customer does not agree, apply the process by stage.
※ Describe the basis of the description in "Part related to nose" in the Owner's Manual.
OR
※ When the nose is severe, replace the module (For models with fix information, upgrade the S/W or provide the description)
OR
※ If there is a "Tak Tak" noise from the cabinet, refer to the KMS fix information and then proceed as shown in the solution manual (For models without any fix information, provide the description)

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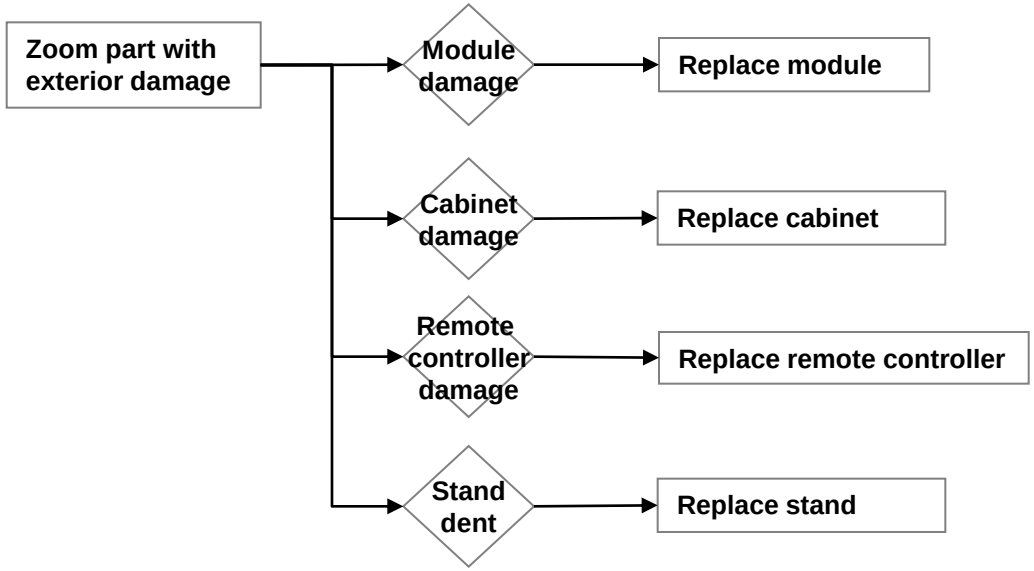
LCD TV	Error symptom	F. Exterior defect	Established date	2013. 01 .09	
		Exterior defect	Revised date		14/14



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Contents of LCD TV Standard Repair Process Detail Technical Manual

No.	Error symptom	Content	Page	Remarks
1	A. Video error_ No video/Normal audio	Check LCD back light with naked eye	A1	
2		LED driver B+ measuring method	A2	
3		Check White Balance value	A3	
4		Power Board voltage measuring method	A4	
6	A. Video error_ No video/Video lag/stop	TUNER input signal strength checking method	A5	
7		LCD-TV Version checking method	A6	
9	A. Video error_Color error	LCD TV connection diagram	A7	
10				
11		Check Link Cable (LVDS) reconnection condition	A8 A9	
12		Adjustment Test pattern - ADJ Key	A10	
13	A. Video error_Vertical/Horizontal bar, residual image, light spot	LCD TV connection diagram	A8	
14		Check Link Cable (LVDS) reconnection condition	A8 A9	
15		Adjustment Test pattern - ADJ Key	A10	
16	<Appendix> Defected Type caused by T-Con/ Inverter/ Module	Exchange T-Con Board (1)	A-1/5	
17		Exchange T-Con Board (2)	A-2/5	
18		Exchange LED driver Board (PSU)	A-3/5	
19		Exchange Module itself (1)	A-4/5	
20		Exchange Module itself (2)	A-5/5	

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Continued from previous page

No.	Error symptom	Content	Page	Remarks
21	B. Power error_No power	Check front display LED	A11	
22		Check power input Voltage & ST-BY 3.5V	A12	
23		Checking method when power is ON	A13	
24		POWER BOARD voltage measuring method	A4	
26	B. Power error_Off when on, off while viewing	POWER OFF MODE checking method	A14	
27	C. Audio error_No audio/Normal video	Voltage and speaker checking method when there is no audio	A15	
28	D. Function error_ No response in remote controller, key error	Remote controller operation checking method	A16	

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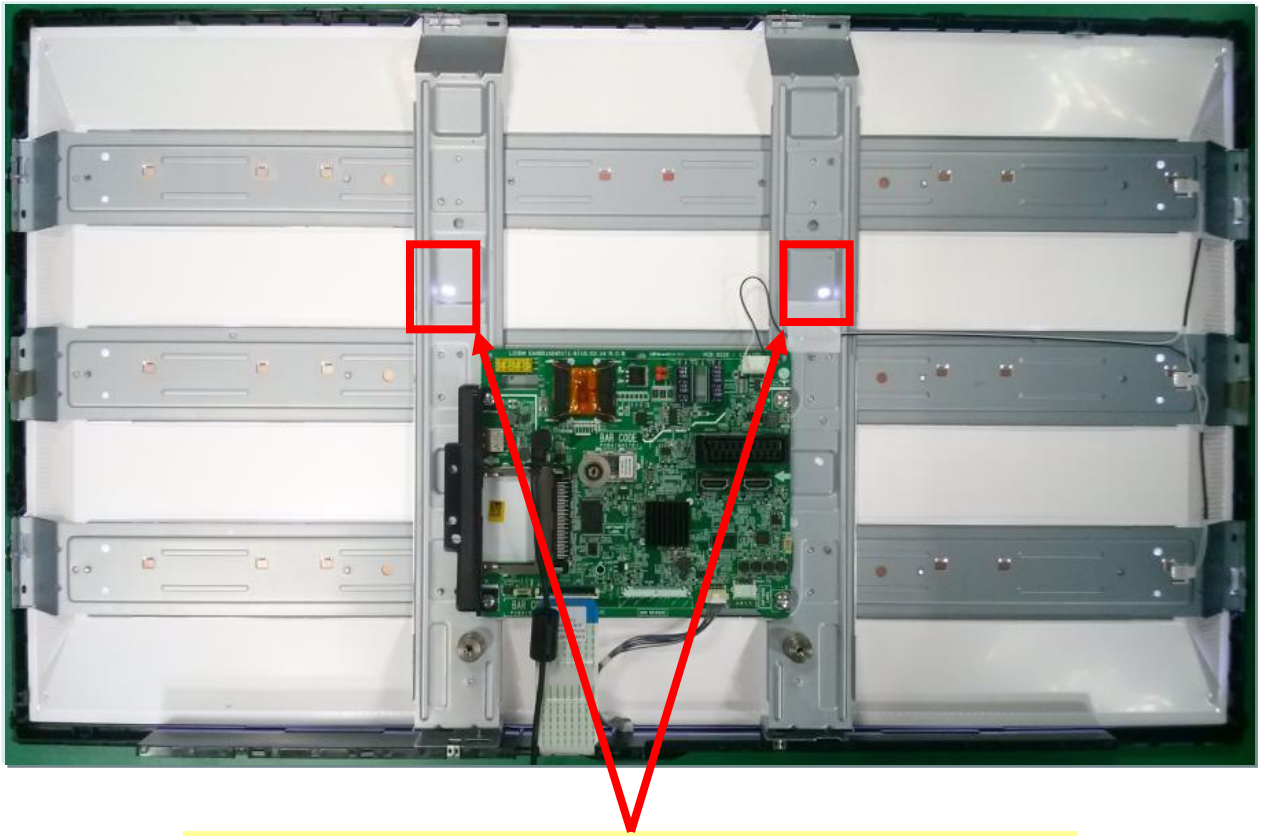
LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2013. 01 .09	
	Content	Check Back Light On with naked eye	Revised date		A1

<ALL MODELS>



Power On -> disjoint back case -> check lighting at 2 points.

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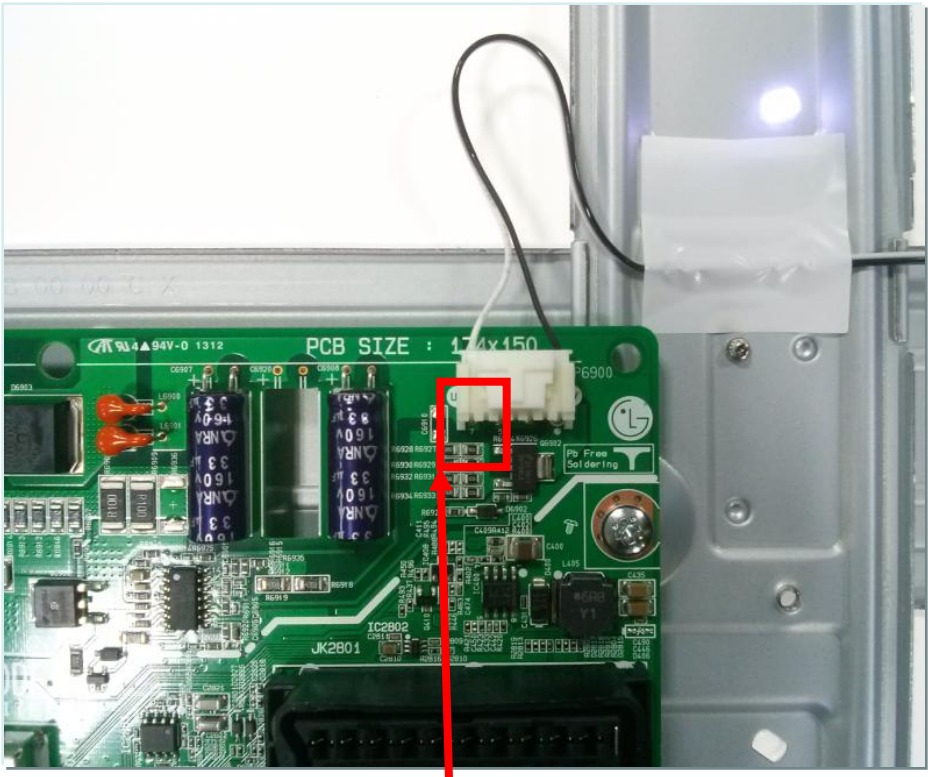
LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2013. 01 .09	
	Content	Inverter B+ 24V measuring method	Revised date		A2

<ALL MODELS>



Measure DC **85_175V** applying to Module from Power Board.

Output 85~175V from Power Board -> supply to Module.
Check Pin contacting statement and connection statement.

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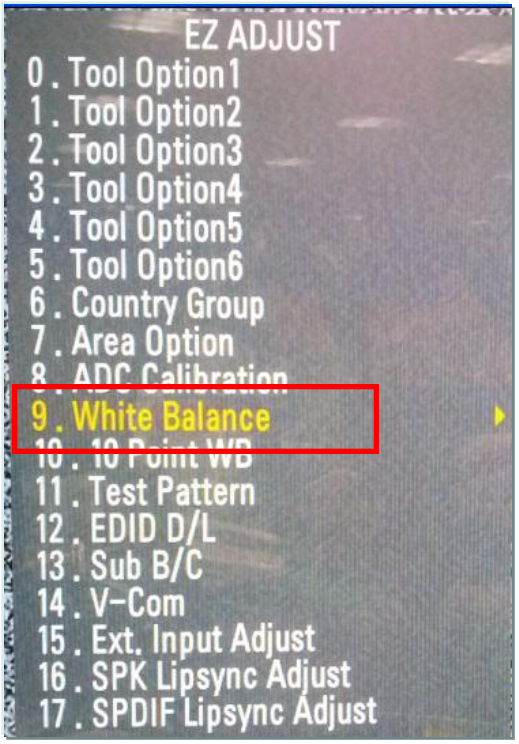
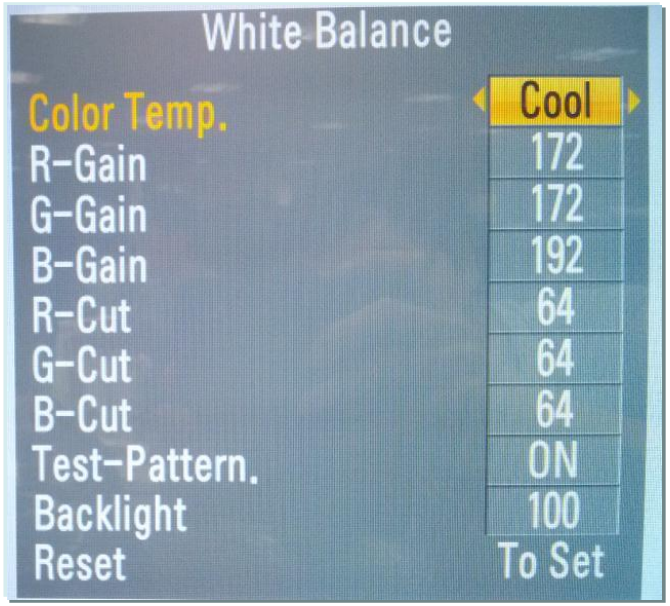
LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2013. 01 .09	
	Content	Check White Balance value	Revised date		A3

<ALL MODELS>


EZ ADJUST
0 . Tool Option1
1 . Tool Option2
2 . Tool Option3
3 . Tool Option4
4 . Tool Option5
5 . Tool Option6
6 . Country Group
7 . Area Option
9 . White Balance
11 . Test Pattern
12 . EDID D/L
13 . Sub B/C
14 . V-Com
15 . Ext. Input Adjust
16 . SPK Lipsync Adjust
17 . SPDIF Lipsync Adjust



Entry method

1. Press the ADJ button on the remote controller for adjustment.

2. Enter into White Balance of item 9.

3. After recording the R, G, B (GAIN, Cut) value of Color Temp (Cool/Medium/Warm), re-enter the value after replacing the MAIN BOARD.

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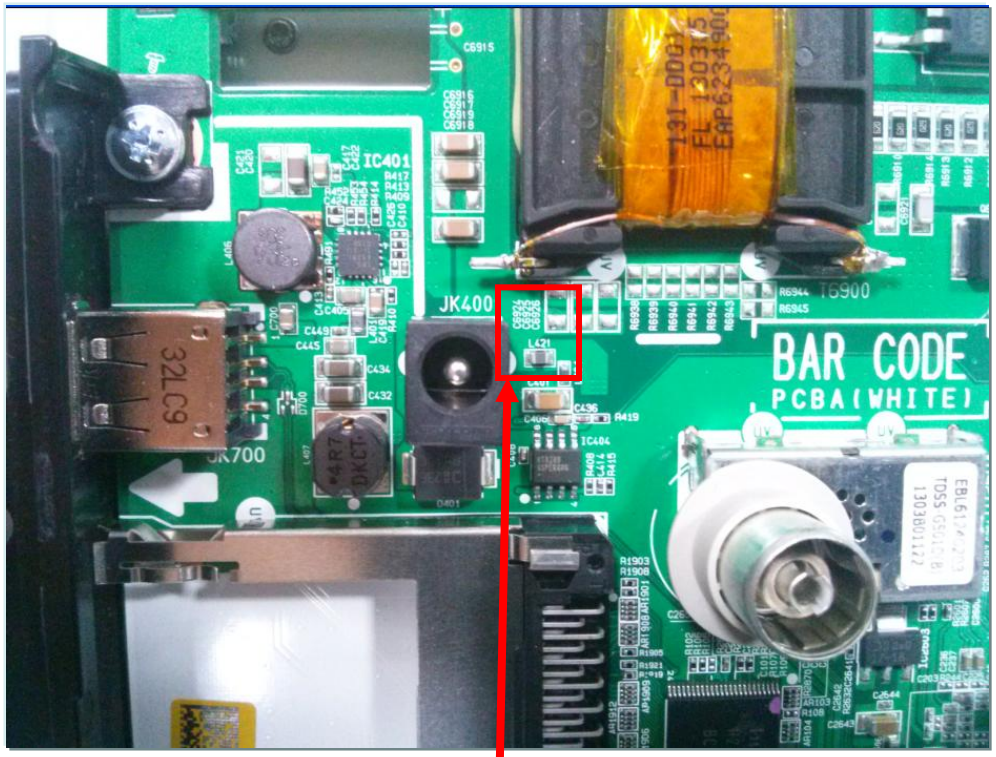
LCD TV	Error symptom	A. Video error_No video/ Audio	Established date	2013. 01 .09	
	Content	Power Board voltage measuring method	Revised date		A4



Check the DC 24V (L421)

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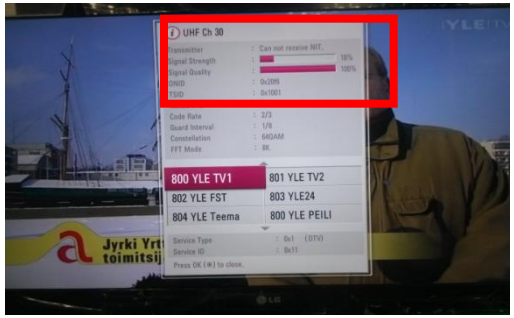
<ALL MODELS>

MENU => Press red key Remote controller=>signal test => Select channel

When the signal is strong, use the attenuator (-10dB, -15dB, -20dB etc.)



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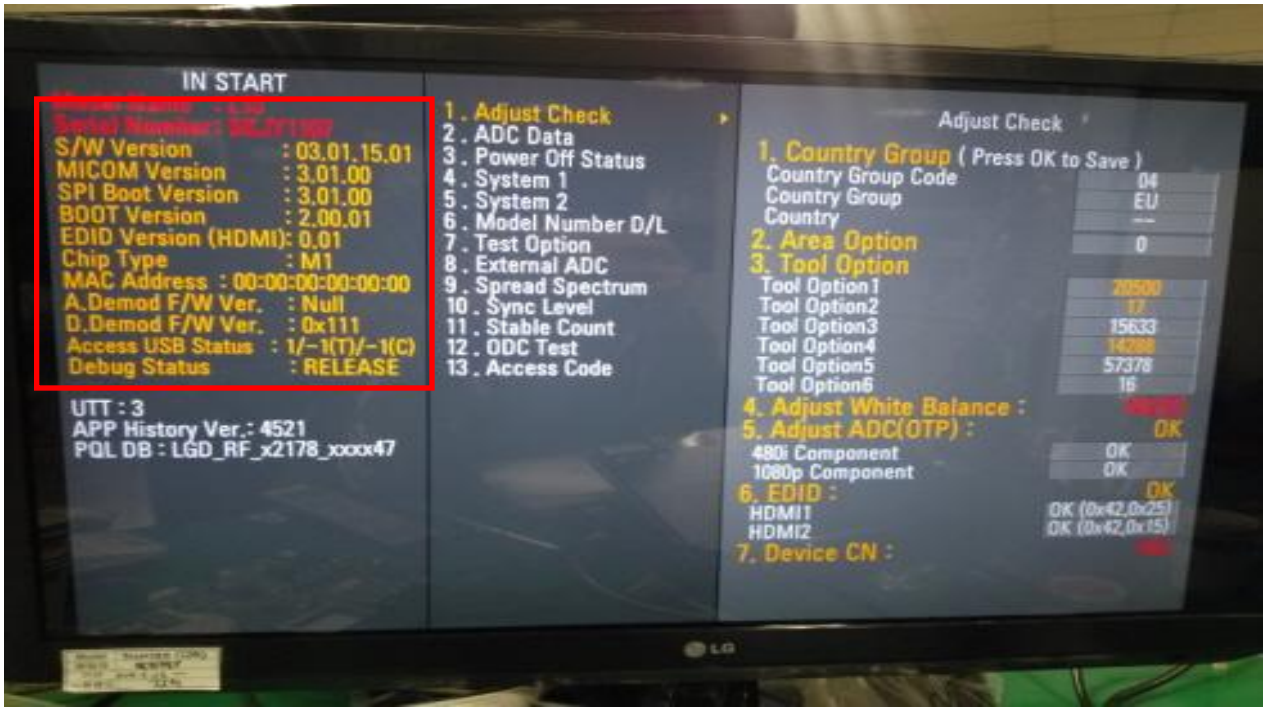
<ALL MODELS>

1. Checking method for remote controller for adjustment

Version



Press the IN-START with the remote controller for adjustment

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LCD TV	Error symptom	A. Video error _Vertical/Horizontal bar, residual image, light spot	Established date	2013. 01 .09	
	Content	LCD TV connection diagram (1)	Revised date		A7

<ALL MODELS>

As the part connecting to the external input, check the screen condition by signal

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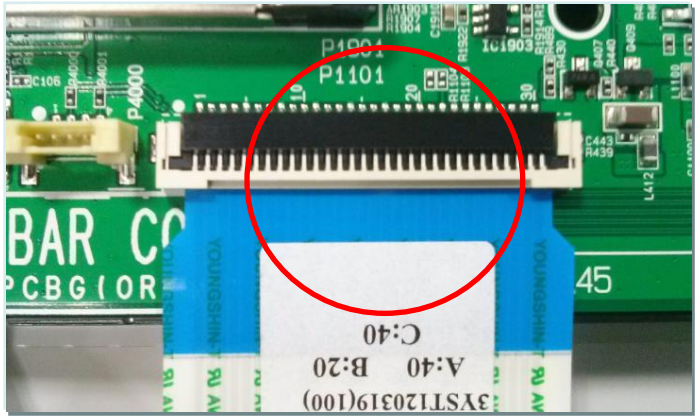
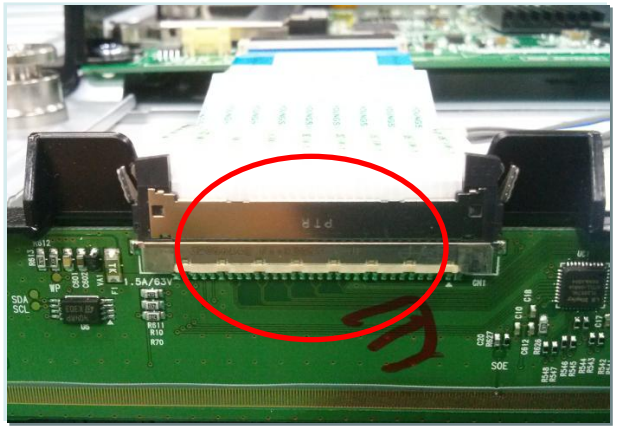
LCD TV	Error symptom	A. Video error_Color error	Established date	2013. 01 .09	
	Content	Check and replace Link Cable(LVDS) and contact condition	Revised date		A8/A9

<ALL MODELS>





1. Check and replace LVDS Cable
2. Check LVDS connection condition

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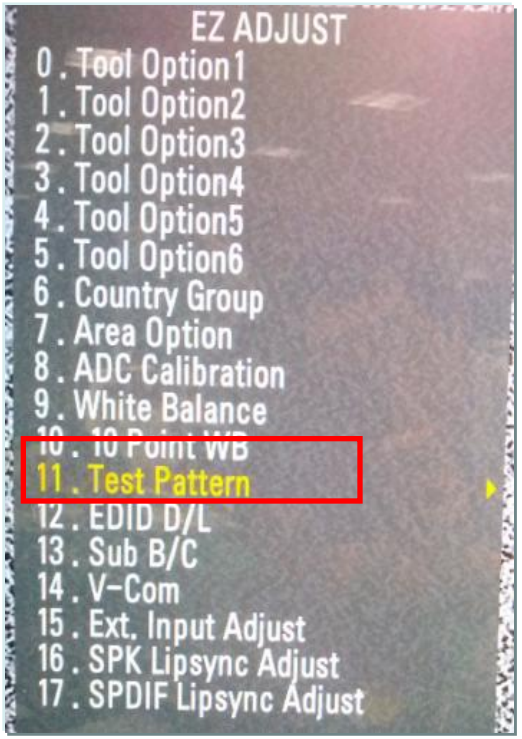
EZ ADJUST
0 . Tool Option1
1 . Tool Option2
2 . Tool Option3
3 . Tool Option4
4 . Tool Option5
5 . Tool Option6
6 . Country Group
7 . Area Option
8 . ADC Calibration
9 . White Balance
11 . Test Pattern
12 . EDID D/L
13 . Sub B/C
14 . V-Com
15 . Ext. Input Adjust
16 . SPK Lipsync Adjust
17 . SPDIF Lipsync Adjust

You can view 6 types of patterns using the ADJ Key

Checking item : 1. Defective pixel 2. Residual image 3. MODULE error (ADD-BAR,SCAN BAR..)
4.Video error (Classification of MODULE or Main-B/D!)

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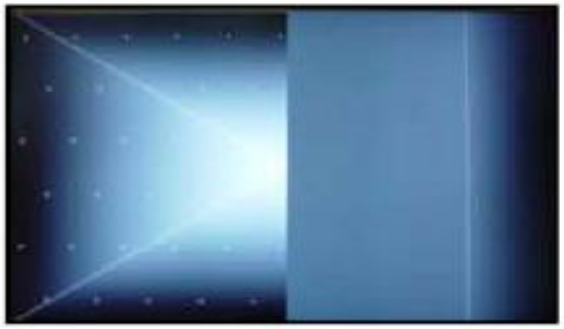
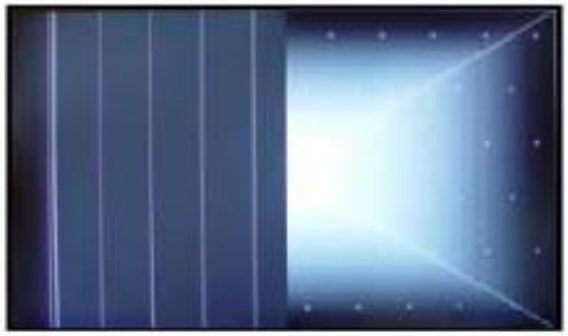
Appendix : Exchange T-Con Board (1)

Solder defect, CNT Broken

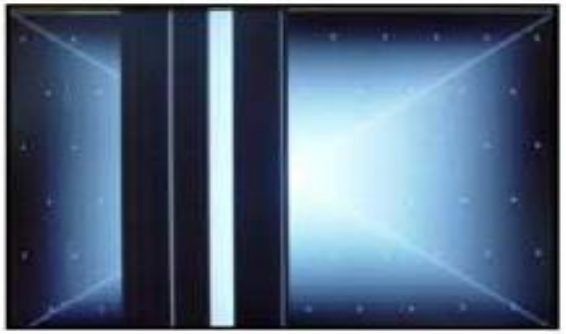


Solder defect, CNT Broken



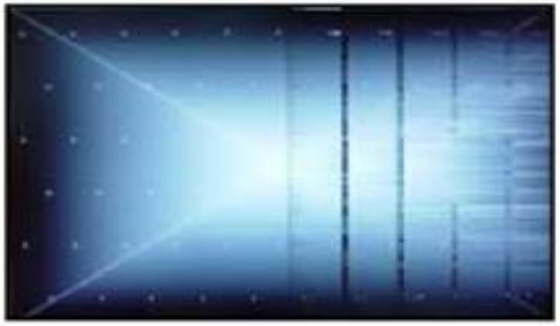
Solder defect, CNT Broken

Solder defect, CNT Broken



Solder defect, CNT Broken

Abnormal Power Section



Solder defect, Short/Crack

Abnormal Power Section

Solder defect, Short/Crack

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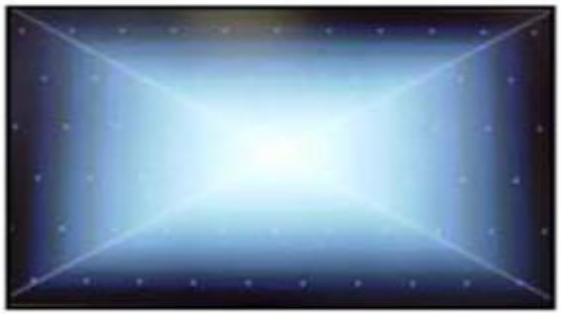
Appendix : Exchange T-Con Board (2)



Abnormal Power Section

Abnormal Power Section

Solder defect, Short/Crack

Solder defect, Short/Crack

Fuse Open, Abnormal power section

Abnormal Display

GRADATION

Noise

GRADATION

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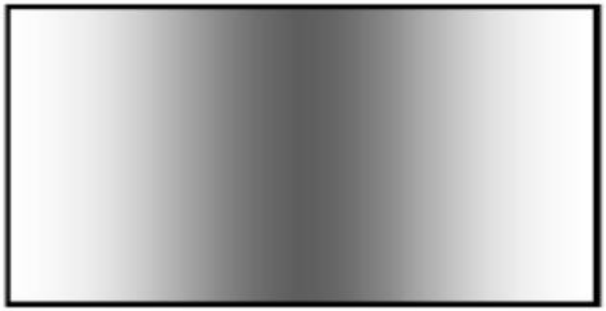
Appendix : Exchange PSU(LED driver)

No Light

Dim Light

Dim Light



Dim Light

No picture/Sound Ok

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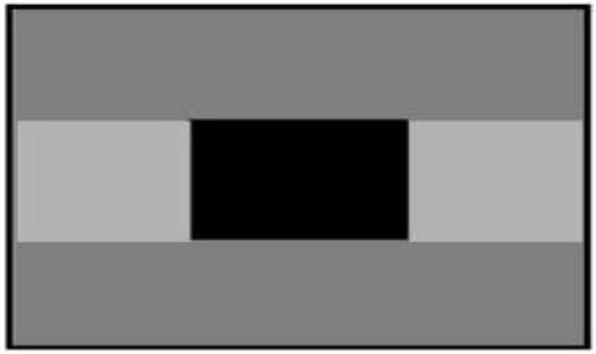
Appendix : Exchange the Module (1)

Panel Mura, Light leakage

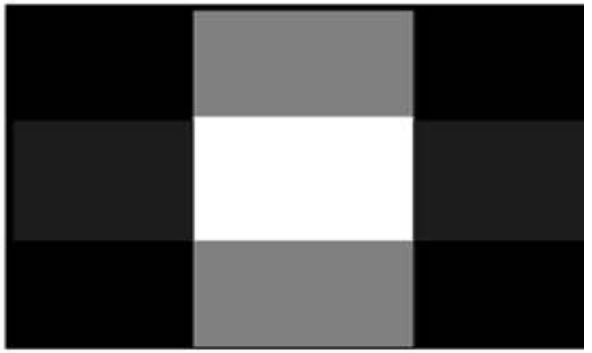
Panel Mura, Light leakage

Press damage



Crosstalk

Press damage



Crosstalk

Press damage

Un-repairable Cases

In this case please exchange the module.

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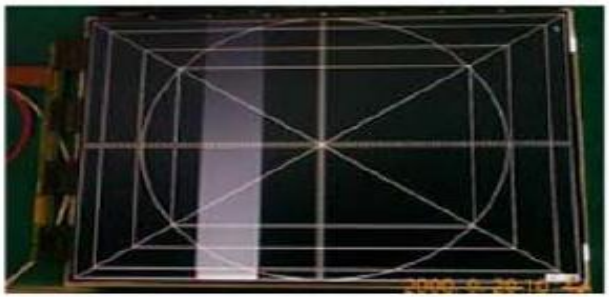
Appendix : Exchange the Module (2)

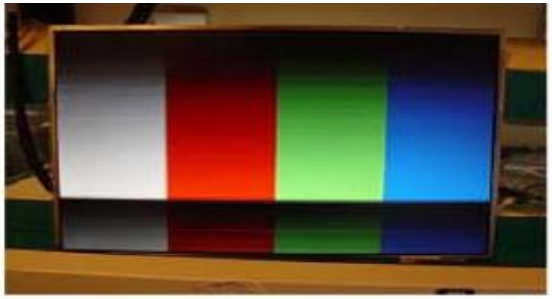


Vertical Block
Source TAB IC Defect

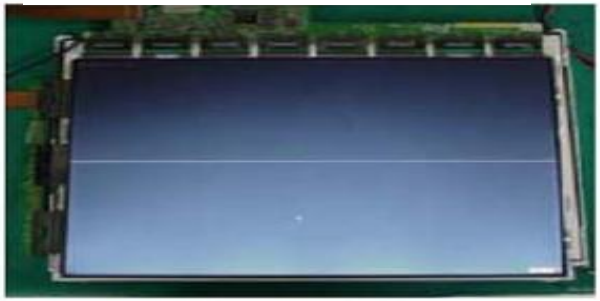
Vertical Line
Source TAB IC Defect

Vertical Block
Source TAB IC Defect

Horizontal Block
Gate TAB IC Defect



Horizontal Block
Gate TAB IC Defect



Horizontal line
Gate TAB IC Defect

Horizontal Block
Gate TAB IC Defect

Un-repairable Cases

In this case please exchange the module.

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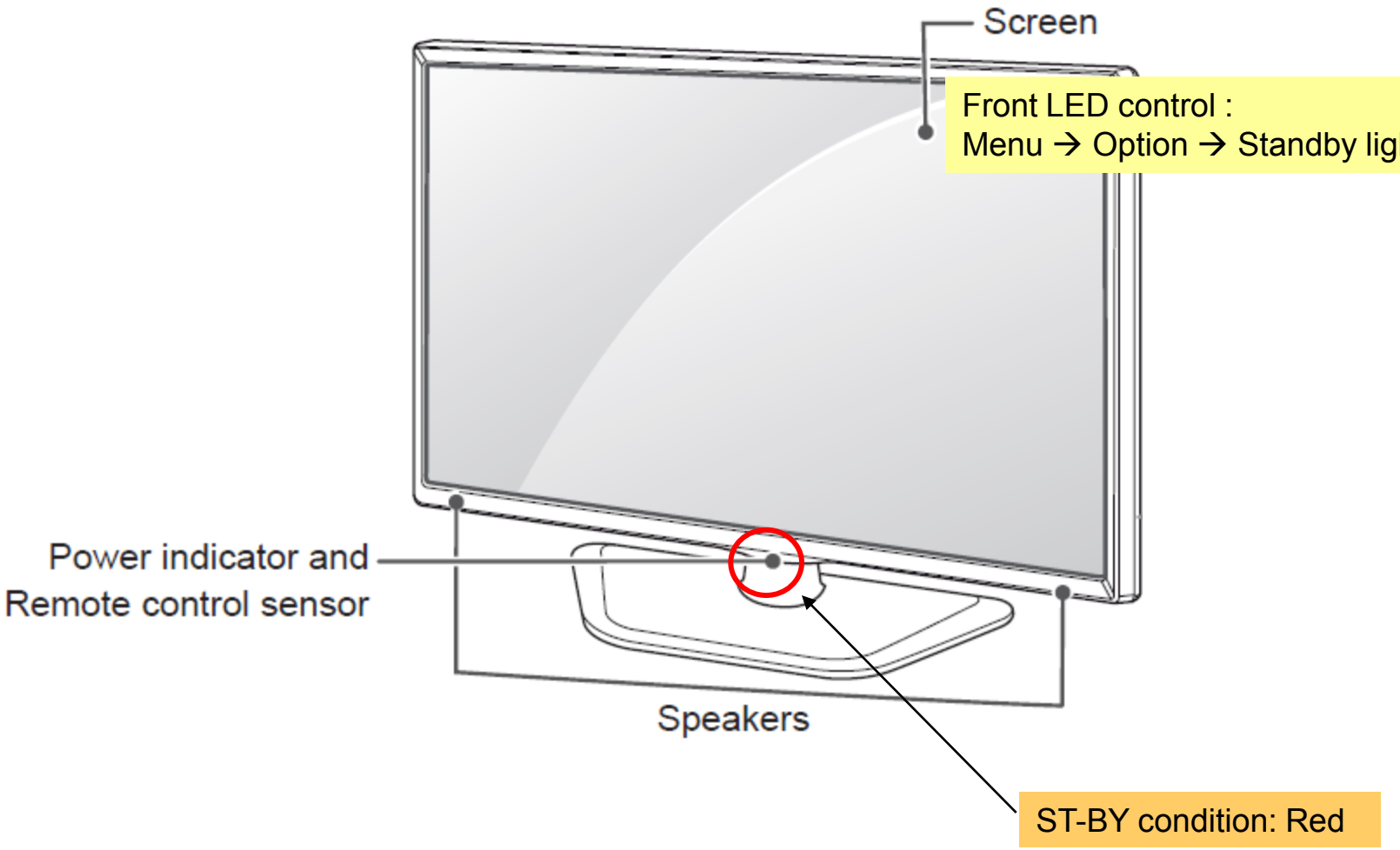
LCD TV	Error symptom	B. Power error _No power	Established date	2013. 01 .09	
	Content	Check front display LED	Revised date		A11



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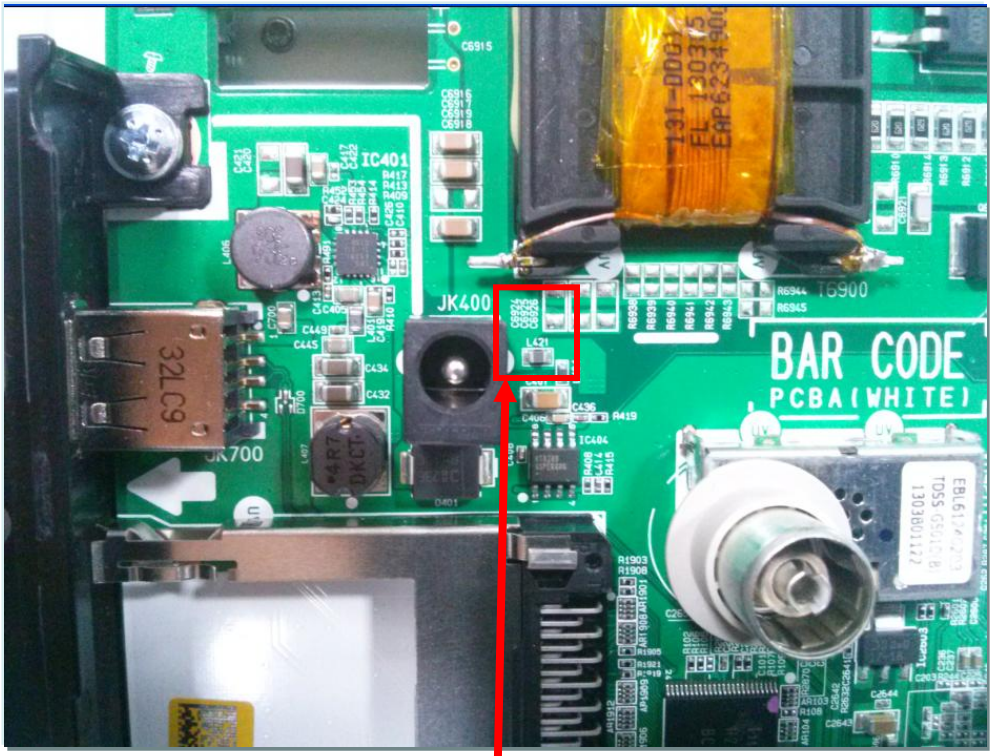
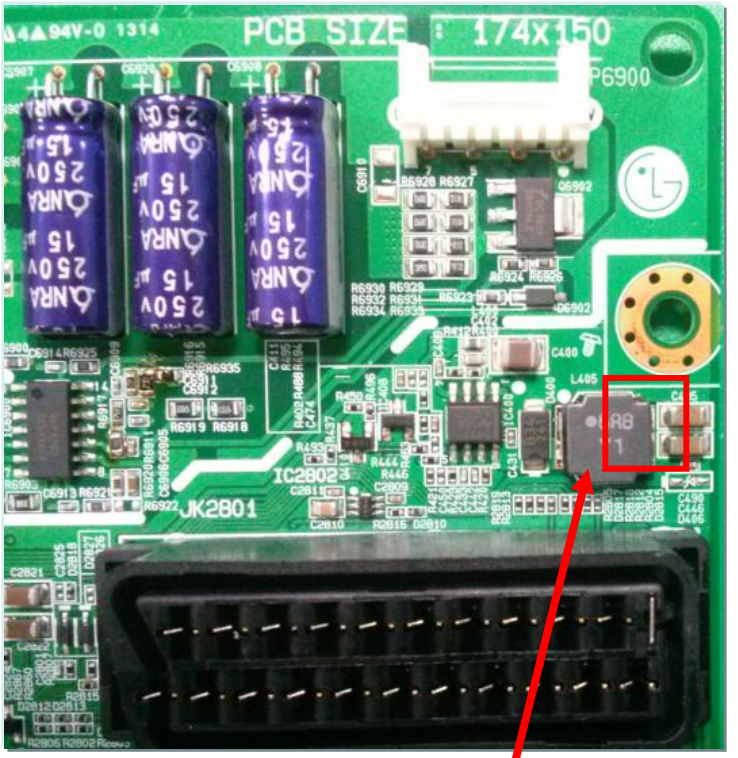
LCD TV	Error symptom	B. Power error _No power	Established date	2013. 01 .09	
	Content	Check power input voltage and ST-BY 3.5V	Revised date		A12



Check the DC 24V (L421)



Check the ST-BY 3.3V (L405)

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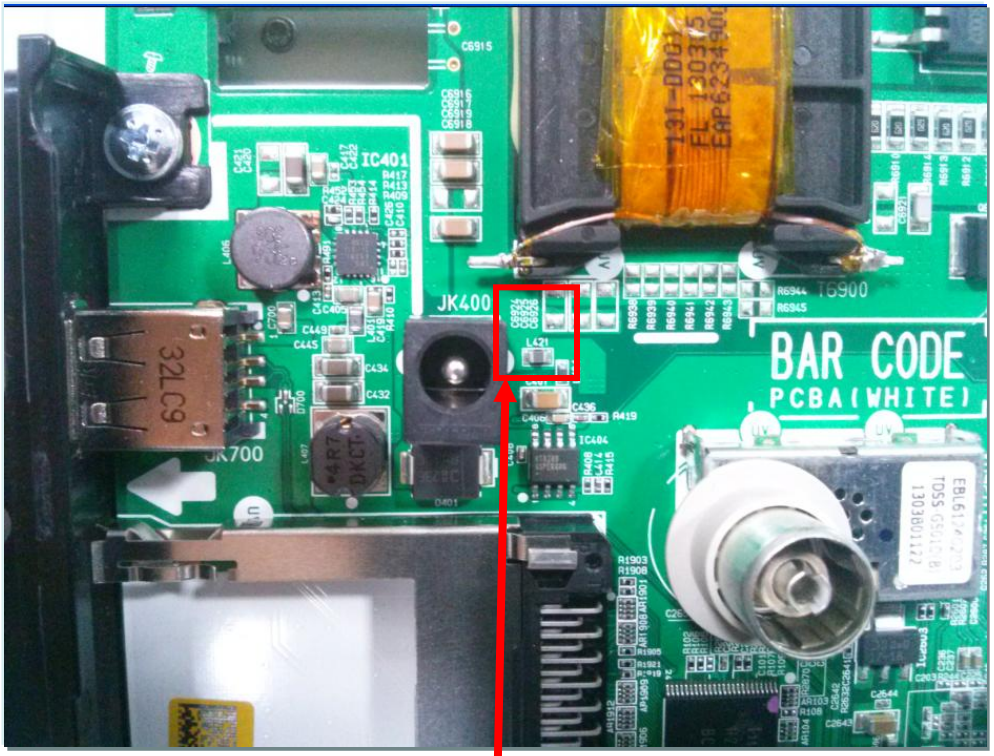
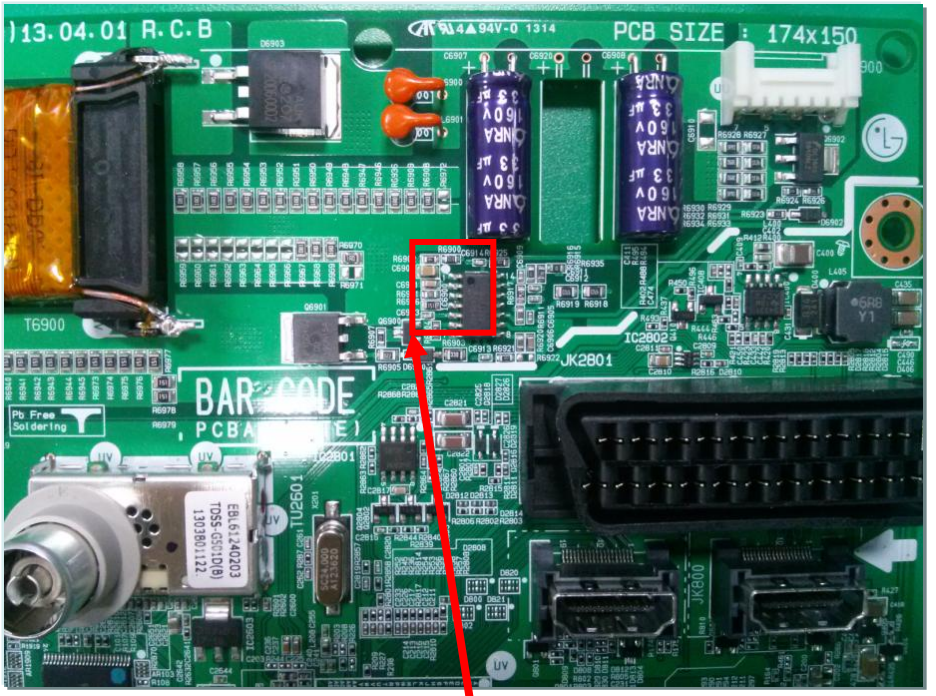
LCD TV	Error symptom	B. Power error _No power	Established date	2013. 01 .09	
	Content	Checking method when power is ON	Revised date		A13



Check the DC 24V (L421)



Check the LED_ON HIGH
(IC6900, pin No. 1)

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LCD TV	Error symptom	B. Power error _Off when on, off whiling viewing	Established date	2013. 01 .09	
	Content	POWER OFF MODE checking method	Revised date		A14

<ALL MODELS>

Entry method

1. Press the IN-START button of the remote controller for adjustment

2. Check the entry into adjustment item 3

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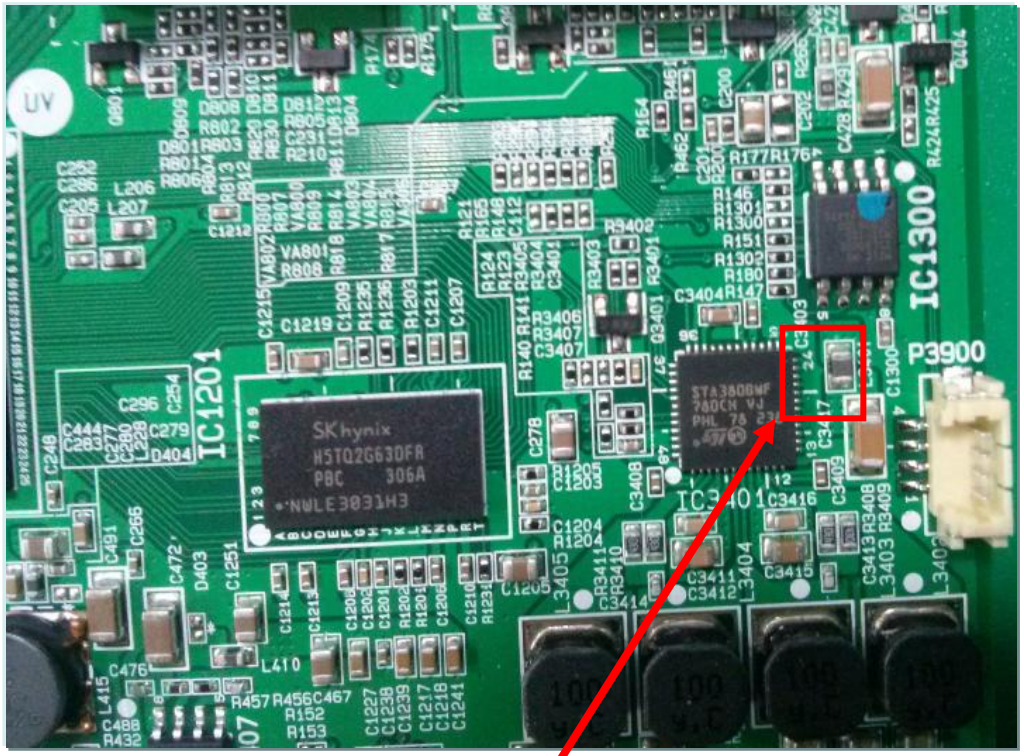
LCD TV	Error symptom	C. Audio error_No audio/Normal video	Established date	2013. 01 .09	
	Content	Voltage and speaker checking method when there is no audio	Revised date		A15

<ALL MODELS>



Check the DC 24V (L3401)

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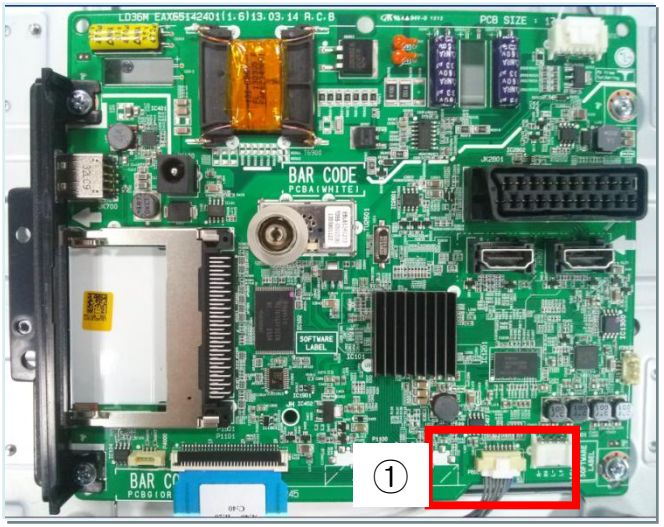
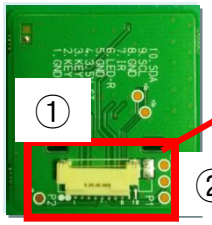
LCD TV	Error symptom	D. Function error_ No response in remote controller, key error	Established date	2013. 01 .09	
	Content	Remote controller operation checking method	Revised date		A16

<ALL MODELS>





P600	
1	GND
2	KEY1
3	KEY2
4	3.5V_ST
5	GND
6	LED_R
7	IR
8	GND

③

Checking order

1. Check IR cable condition between IR & Main board.
2. Check the st-by 3.5V on the terminal 4.
3. When checking the Pre-Amp when the power is in ON condition, it is normal when the Analog Tester needle moves slowly, and defective when it does not move at all.

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